Connecting Redmond

Traffic Technical Memorandum

connecting REDMOND

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INTRODUCTION

The traffic analysis documented in this report was designed to test the traffic circulation elements of a concept selected by a diverse group of stakeholders at the "Connecting Redmond" workshop held in January 2002.

Concept Development and Description

As part of the Downtown Transportation Master Plan, the study team developed and presented a set of three Downtown Master Plan concept packages to the public. A preferred concept was identified by the public at the January "Connecting Redmond" workshop. These concept packages represented logical groupings of the different elements explored during Council study sessions in 2001. The framework for development of the concepts included the vision statement for downtown and seven guiding principles, the key elements of which can be summarized as follows:

Vision Statement

" *…to reclaim our downtown as an economically healthy, people-friendly place, enhanced by the movement of pedestrians, bikes, cars, and a diversity of businesses…*"

Guiding Principles

Circulation: A plan for Downtown Redmond should contribute to a comfortable pedestrian environment and address the issue of through-traffic.

Parking: Parking in Downtown Redmond should be available for businesses, residents, and visitors and should support the pedestrian environment and the viability of transit in the downtown.

Transit: A plan for downtown transit service and facilities should attain the goal of having transit, pedestrians, bicycles, and carpools comprise a significant share of the commute trips to and from Downtown Redmond.

Parks and Open Spaces: A successful Downtown Redmond should include parks and open spaces that create a sense of place, are linked, and serve a variety of purposes.

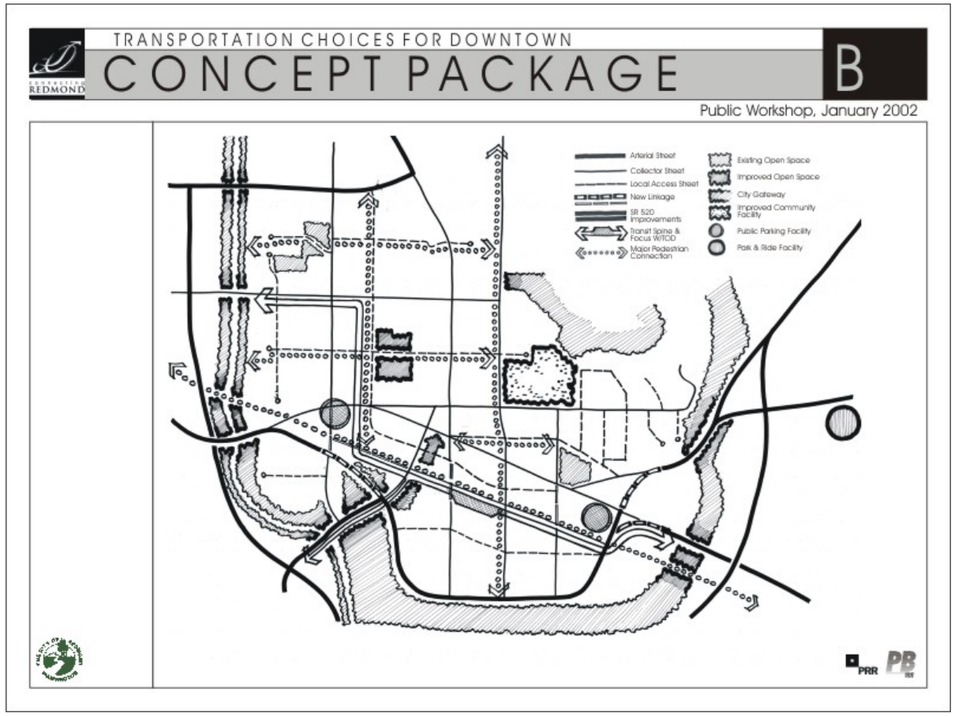
Land Use: Downtown Redmond should include a variety of land uses that meet the residents' needs for employment, housing, shopping, recreation, entertainment, and cultural and community activities.

Redmond Way and Cleveland Street Couplet: Future improvements to Redmond Way and Cleveland St. should contribute to and reinforce this area as Redmond's "Main Street".

Railroad Right-of-Way: Any design for the BNSF right-of-way should take full advantage of this asset.

At the January 2002 workshop there was strong consensus on what should be included as the principle elements of a preferred concept. The majority favored the transportation elements portrayed in Concept B (illustrated in Figure 1).

Figure 1
Concept Package B



Concept B Features

Circulation

- SR 520 and Bear Creek Parkway improvements for pass-through traffic
- Downtown streets all two-lane/two-way
- Connect northwest north-south streets intersecting the BNSF right-of-way

Open Space

- A "Central Park" at the existing Park-and-Ride lot
- Use of BNSF as a major open space and pedestrian connection

BNSF

- Acquisition of the right-of-way for public use
- Open space and trails
- Potential use for transit vehicles

Transit

- A transit "spine" (most buses would run on this street)
- Expansion of the Park-and-Ride lot east of downtown

Parking

- Increased on-street parking
- Additional parking facilities with ground-floor retail uses

Analysis Approach

The traffic analysis was designed to test Concept Package B ("the Concept") and identify fatal flaws, critical issues, and overall general operating levels. The analysis compares the Concept with a No Action option under 2020 traffic volumes. The No Action option consists of the existing year 2002 street network with minor programmed improvements added.

This analysis is unusual in that it does not test the performance of a traffic solution, but rather tests whether a design solution for Downtown Redmond can function from a traffic standpoint. The traffic analysis in this instance is just one measure of the Concept's feasibility. The analysis tests for fatal flaws (i.e. is there grid lock in the downtown?) and describes overall traffic performance levels, but makes no judgment on the levels of congestion that may be acceptable. The objective, as developed in the planning process, is to create a pedestrian-friendly downtown with all two-way streets, and to provide an alternate route around the downtown to keep through-traffic from impacting downtown streets. The Concept reduces the capacity of most downtown streets in favor of a street design that supports local traffic and creates a pedestrian-friendly environment. At the same time, the Concept envisions capacity enhancements, principally on Bear Creek Parkway and SR 520, to lure through-traffic away from the downtown.

It should be noted that this analysis was limited to the downtown. As part of an overall Transportation Master Plan, the city-wide impacts of decisions made for the downtown will need to be further evaluated. Specifically, all major entry points to the downtown show significant queuing under both the No Action option and the Concept. This queuing could spill back to intersections and facilities outside of downtown, potentially causing congestion or compounding existing congestion in areas beyond the downtown. An evaluation of these queuing impacts was beyond the scope of the analysis for the downtown plan.

Summary of Findings

- The traffic analysis results are generally consistent with the objectives that the Concept was intended to achieve. Bear Creek Parkway would function as an alternate route that carries high volumes of through-traffic and provides an attractive option to slower moving downtown streets. Major gateway intersections would experience improved operations, fulfilling the notion of a strong ring road concept. Redmond Way and Cleveland St. would carry a high proportion of local trips. Traffic in the downtown core is projected to move more slowly, and pass-through traffic would be discouraged from using downtown core streets.

- Trips to, from, and through the Study Area are forecast to roughly double by 2020. Both the No Action option and the Concept are projected to experience significantly higher levels of delay than exists today.

- The Concept is projected to experience a significant system-wide improvement in traffic operations as compared to the No Action option. Based on a performance index that considers several measures of congestion (i.e., intersection delays, number and frequency of stops, and impacts of queuing) the Concept shows a 39% improvement in system performance over the No Action option. Despite traffic doubling over 20 years, traffic is still expected to move through the downtown, albeit at levels of congestion higher than exist today. It should be noted that although system performance is expected to improve under the Concept, under both the Concept and the No Action option, significant overall levels of delay are forecast to occur. This improvement should not be construed as "congestion relief"; the Concept simply has some overall system-wide performance advantages compared to the No Action option. It should also be noted that the Concept represents significant changes in the street network and consequently, changes in the nature and location of congestion.

- The forecast PM peak-hour traffic volume on Redmond Way and Cleveland St. combined (approximately 3,000 in both directions) is similar to existing traffic volumes of 3,200 for the two streets. Therefore, the capacity improvements envisioned for Bear Creek Parkway and SR 520, serve two purposes: to accommodate future traffic growth and to segregate through-traffic from local traffic.

- Converting the Redmond Way and Cleveland St. couplet to two-way operation would reduce capacity and effectively slow traffic in the downtown core. The expanded Bear Creek Parkway would accommodate significant traffic growth. Combined, these factors facilitate an expected reduction in traffic volumes on downtown streets under the Concept, as compared to the No Action option.

- Bear Creek Parkway would be a viable alternative route around the downtown core. Bear Creek Parkway would be able to handle large volumes of traffic and would provide more competitive travel time as compared to moving through the downtown core itself.

- Sensitivity analyses indicated that capacity improvements to SR 520 would result in roughly 400 eastbound and westbound trips diverted away from downtown streets in the PM peak hour. This level of diversion would provide important relief to downtown street network operations, but is not necessarily critical to the Concept's success.

- Vehicle delay at most major intersections entering the downtown would be similar or improved when comparing the Concept to the No Action option.

- The Concept and No Action option are composed of substantially different street networks and have significantly different traffic forecasts for any given street. Although the overall traffic forecast is roughly the same, the distribution of traffic within and through the study area for the Concept and No Action option varies.

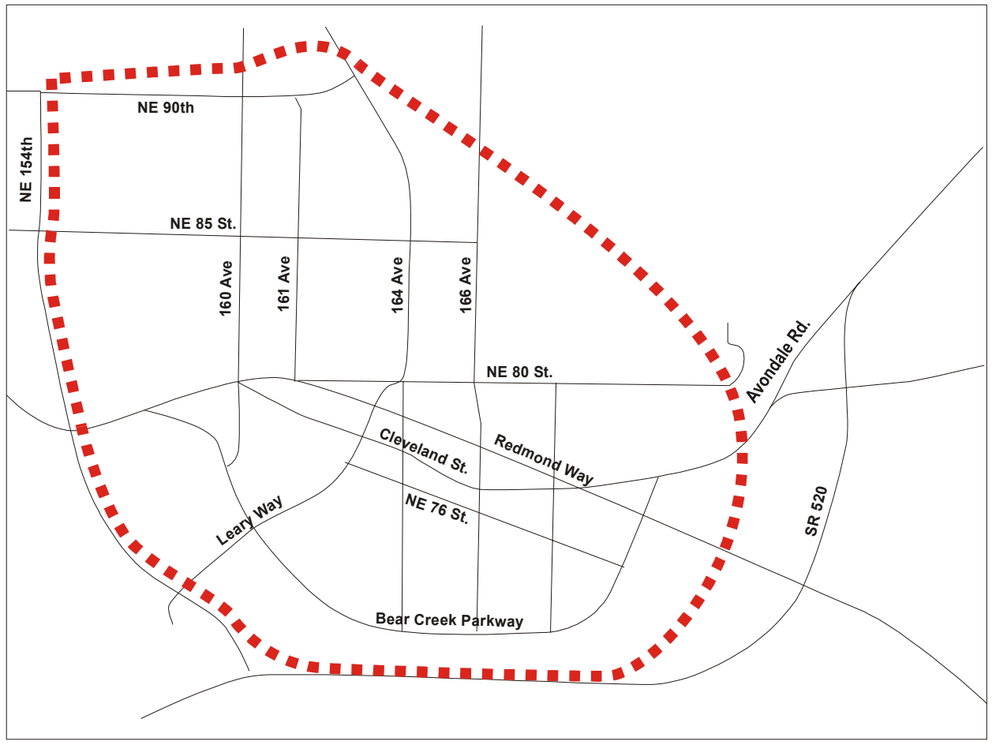
- The queuing impacts on traffic entering the downtown have not been fully evaluated, because this is outside the focus of the downtown study. A Transportation Master Plan at the city-wide level would further analyze traffic conditions on the approaches to the downtown.

OVERVIEW AND METHODOLOGY

Study Area:

The Study Area consists of Downtown Redmond (Figure 2), as defined by Bear Creek Parkway to the south, NE 90th St. to the north, the Sammamish River to the west, and Bear Creek to the east.

Figure 2
Study Area



Methodology

The analysis consisted of comparing the Concept against a No Action option under year 2020 forecasted traffic levels. The analysis relied on two models: the City of Redmond Travel Demand Forecasting Model for 2020 travel forecasts, and a micro-simulation model (Synchro) used for traffic operational analysis. The demand forecasting model and simulation model both considered PM peak-hour conditions.

Although the Concept and No Action options were simulated at a detailed operational level, evaluation measures were developed that considered broader levels of impact. The intent of the analysis is to generally determine how the Concept compares against the No Action option, rather than analyzing specific comparison points (e.g. at an intersection-by-intersection level). Because the Concept and No Action options present substantially different street networks, the results of site-specific location-to-location comparisons need to be interpreted within the context of each option's objectives.

Comparison Measures

The following measures were developed to compare the Concept with the No Action option.

Travel Characteristics

This measure assesses how traffic volumes and trip patterns change in response to network changes. Trip patterns are inferred from model forecasts and existing and projected traffic data, including detailed turning movements.

LOS and Approach Delay

This measure examines level-of-service (LOS) and simulated delay for intersections and approaches. Data for intersections and approaches are graphically depicted using a color-coded three-tiered level of delay. In addition, streets are represented with lines of varying thickness to provide a general representation of projected traffic volumes.

Travel time

Travel times were developed for selected routes through the downtown, as an additional method of comparison. Travel times were based on free-flow travel time, with the approach delays factored in for each route under the Concept and No Action option.

Models and Assumptions

Demand Forecasting Model and Assumptions

2020 forecasts were developed for the Concept and the No Action option. The forecasts were based on the existing 2020 City of Redmond city-wide travel demand forecasting model, with some modifications to the network in the downtown area. No changes were made to land use assumptions. Model documentation is provided as Exhibit 1. The model base year was 1999. It should be noted that the base-year model does not include the 90th St. Bridge and therefore some adjustment to future traffic volumes was required to compensate for excessively high growth rates on NE 90th that resulted when future and base year forecasts were compared (The base year traffic volumes in the Synchro model were collected after construction of the bridge).

2020 No Action Network: The existing 2020 Redmond network was modified to establish a network that reflected pipeline projects, but did not include longer-term planned projects. Longer-term projects were not considered at this stage and will be further evaluated as part of the city-wide Transportation Master Plan.

Principle revisions to the No Action network included:

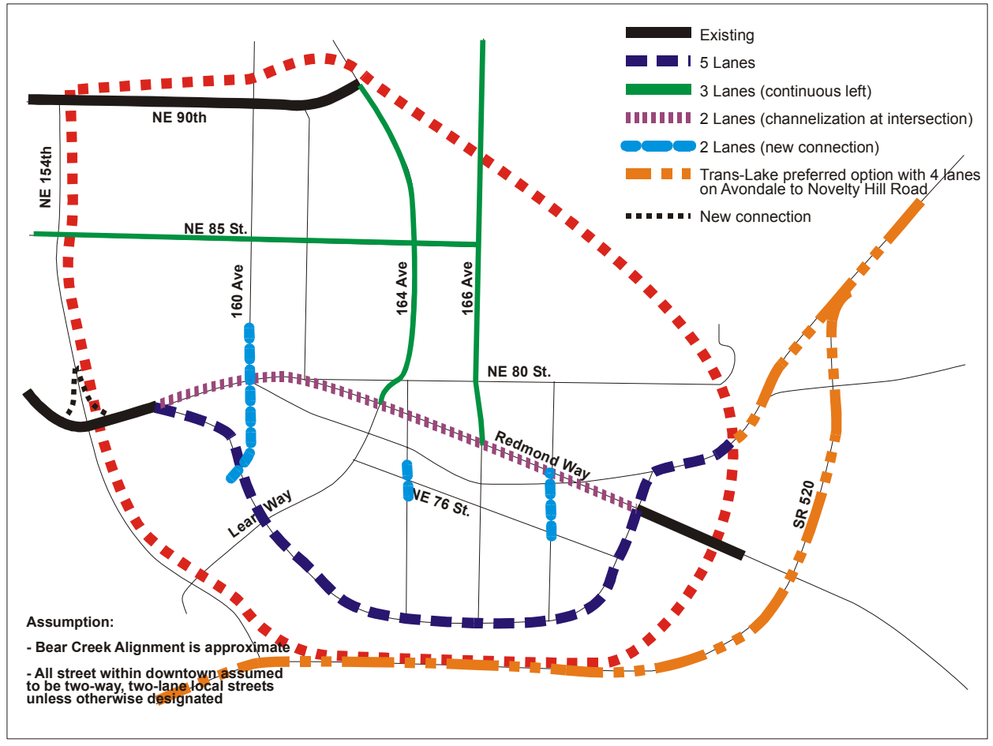
- Elimination of the 160th Ave. extension to connect to SR 202
- Elimination of a new crossing across Bear Creek, connecting Bear Creek Parkway to West Lake Sammamish Parkway

The Concept network was a modified No Action network and included the following revisions (highlighted in Figure 3):

- Capacity increases on SR 520 based on the current preferred alternative for SR 520 (see Exhibit 2)
- Expansion of Bear Creek Parkway from Leary Way to Redmond Way
- Conversion of Redmond Way from a one-way street to a three-lane two-way street
- Conversion of Cleveland St. from a one-way street to a two-lane two-way street
- Conversion of NE 85th, SR 202 (164th), and 166th from four-lane to three-lane two-way streets
- New north/south connections across BNSF at 161st, 164th and 168th Avenues
- New ramps connecting Redmond Way to 154th Avenue NE

For the demand forecasting model, roadway link capacities were adjusted to approximate street configuration capacities.

Figure 3
Concept Definition for Modeling Purposes



Micro-Simulation Model and Assumptions

The operational analysis of PM peak-hour traffic conditions was performed for the various intersections discussed in the Existing Conditions section (see Table 2), in accordance with the Transportation Research Board *2000 Highway Capacity Manual (HCM)*. This type of operational analysis is used to determine the level-of-service (LOS) for various transportation facilities. The HCM defines standardized levels of service, which generally reflect the ratio of traffic volume to roadway/facility capacity for a variety of facilities, including freeways, highways, intersections, and multi-lane arterials.

The HCM also develops specific analysis methodologies for intersections, to compute levels of service for signalized and unsignalized facilities. Only signalized intersections were considered for this study, though unsignalized intersections were also included in the analysis network. No specific adjustments were made to the micro simulation model to account for higher levels of pedestrian activity in future years.

The methodology used to determine the LOS at signalized intersections focuses on determining the volume to capacity (v/c) ratio for various intersection movements, and ultimately on determining the average *control delay* for those movements. *Delay* is generally used to measure the degree of driver discomfort, frustration, fuel consumption, and lost time. *Control delay* is defined as the amount of time that a vehicle is stationary, plus the time needed to accelerate, decelerate, and move up within a queue.

In addition to the overall quantity or magnitude of traffic flow (i.e. intersection turning-movement volumes or average daily traffic), the following three critical factors also influence signalized intersection operations and level-of-service:

- Type of signal operation provided (fixed time vs. actuated)
- Signal phasing pattern and cycle length used
- Specific allocation (split) of green time within each phase

Signalized intersections for the study effort were analyzed using the combined Synchro/SimTraffic software package. Synchro is an analysis program that is primarily used to optimize traffic signal timings and calculate equation-based LOS results (using a method analogous to the HCM method). SimTraffic is a simulation model that models actual traffic flows on a microscopic level (individual vehicle basis) to estimate delay, which can then be used to estimate LOS based on standard HCM ranges. SimTraffic is especially useful when analyzing over-saturated traffic conditions (severe congestion) because of its ability to incorporate and address queuing effects and spillback at intersections.

The City of Redmond provided existing traffic signal phasing and timing data. The LOS range for signalized intersections is LOS A to LOS F, with the former indicating low levels of congestion and the latter indicating levels ranging from high delays to gridlock on intersection approaches and in traffic streams. Table 1 summarizes the general relationship between LOS and delay for signalized intersections.

Table 1 - Signalized Intersection Level-of-Service Criteria

LOS	*Delay* (sec/veh)	*Traffic Flow Characteristics*
A	< 10	Virtually free flow, unimpeded operation
B	> 10 and ≤ 20	Minor delays, generally unimpeded operation
C	> 20 and ≤ 35	Some delays, but stable traffic operation
D	> 35 and ≤ 55	Noticeable approach density and delays
E	> 55 and ≤ 80	Operating conditions at or near capacity
F	> 80	Forced flow, breakdown of intersection approaches

Transit Assumptions

Transit issues can be addressed in the analysis as part of the demand-forecasting model and/or as part of the micro-simulation model. As part of the demand-forecasting model, non-SOV mode-share targets have

the effect of lowering or increasing the volumes of vehicles predicated for the forecast year. The micro simulation analysis can evaluate how traffic impacts transit operations and vice versa.

The Redmond Demand-Forecasting Model includes 2020 mode shares that were adjusted to meet Redmond's Commute Trip Reduction (CTR) targets. The mode split target for downtown, as stated in the City of Redmond's Comprehensive Plan, is 30% for the year 2012. The 2012 target was carried forward to the 2020 forecast year. The target refers to the percent of daily trips by modes other than Single Occupant Vehicles (SOV) and includes vanpools, bicycles, and pedestrians in addition to transit. In the downtown, transit's share of all daily trips is currently approximately 1% or 3% of work trips.

The micro-simulation model did not consider transit operations beyond what is already built into the heavy vehicle percentages derived from existing traffic counts. The transit component included in the concept was limited to the identification of BNSF as a potential transit spine, and therefore no specific transit operation issues were identified that warranted review. For example, the notion of a transit spine on key streets in the downtown was not developed further as part of the concept. Analysis of a transit spine concept may have included consideration of inline stops and the impact on traffic, or the evaluation of transit operations based on the location of transit stops.

EXISTING CONDITIONS

Roadway Network

The transportation network serving downtown Redmond consists of a variety of different roadways. Streets within the study area range from narrow two-way, two-lane local streets to major one-way multi-lane arterials and limited-access facilities. Characteristics of these roadways vary with respect to lane number, width, grades, and posted speeds. Differences are based on specific functions within the roadway network, and on regional corridor capacity and access requirements within the downtown core. The primary roadways in the study area are described below.

Redmond Way
This principal arterial serves as the main east-west backbone through the downtown area. The roadway transitions from a two-way, five-lane configuration east of 160th Ave, to one leg of a one-way couplet system (with Cleveland St.) between 160th Ave. and Avondale Way. Two to three one-way lanes are provided for the westbound couplet section, and two lanes are provided in each direction for the two-way segments. The posted speed limit is 35 mph and parking is provided for most segments within downtown. Based on known distributions for regional travel, trips along Redmond Way are evenly split between destination trips (stopping in downtown) and pass-through trips (heading toward locations outside of downtown). Access to and from the Redmond Way mainline is provided through a system of signalized intersections.

Cleveland Street
This principal arterial is the major eastbound route through downtown, comprising the other leg of the Redmond Way-Cleveland St. one-way couplet system. Two to three one-way lanes are provided on Cleveland St. within the couplet section, with parking available on both sides of the arterial. As with Redmond Way, trips along Cleveland St. are evenly split between destination trips and pass-through trips. Movements to and from Cleveland St. are made via various intersection signals. Vehicle speeds on Cleveland St. are moderate and the posted speed limit is 35 mph.

Bear Creek Parkway
This roadway is designated as a minor arterial and defines the southern boundary of the arterial study area. One travel lane is provided in each direction for most segments, accompanied by turn lanes/pockets at various intersections. Parking is not allowed on this arterial and intersection control is generally provided via stop signs (between Leary Way and Redmond Way). Due in part to congestion along the SR-520 mainline, Bear Creek is used as an alternate pass-through route for east-west travel, especially for eastbound traffic during the PM peak hour. As such, a large proportion of peak-hour trips on this route consist of pass-through trips.

Leary Way
Leary Way is a designated minor arterial oriented to the north and south. It serves as a major link between SR-520/West Lake Sammamish Parkway and the downtown core, and is a connector and bikeway for neighborhoods to the north and east. Right-of-way for Leary Way is limited to four travel lanes between West Lake Sammamish Parkway and Bear Creek Parkway, allowing for various combinations of through/turn lanes. The roadway terminates at a T-intersection with 80th St. and further connects to 164th Ave. via 80th St. Travel demands on Leary Way are diverse and range from pass-though trips looking for an alternate to SR-520 to primary destination trips.

160th Ave. NE
160th Ave. is designated as a principal arterial and is oriented toward the north and south. It connects the north downtown area to the Town Center area and provides access to communities farther north via NE 90th St. The lane configuration varies depending on the segment in question, with one to two lanes turn lanes in each direction. Traffic volumes on 160th Ave. are modest, even during peak periods. Within the study area, traffic signals on 160th Ave. are located at 90th St., 85th St., and Redmond Way.

161st Ave. NE
This north-south roadway is a collector arterial that carries a moderate amount of traffic during peak periods (higher in the PM peak). 161st Ave. provides local access and circulation for trips within the downtown area and is not intended for use as a major bypass route. The arterial is configured as a four-lane section with two travel lanes in each direction (with the exception of the three-lane segment and bus layover adjacent to the Park-and-Ride). It is designated as a bikeway from Redmond Way to 90th St. in the Redmond City Center Bicycle Plan. Connections to 85th St. and 90th St., and therefore to 164th Ave. and 166th Ave., allow 161st Ave. to be used for local and collector access to communities to the north.

164th Ave. NE
164th Ave., also known as SR-202 or Redmond-Woodinville Road, is a principal arterial oriented to the north and south and has a posted speed limit of 25 to 35 mph. This roadway ranges from two lanes near Redmond Way to four lanes near 85th St. 164th Ave provides a strong link between downtown and communities to the north (e.g., Woodinville and Kirkland), and is used for both local and regional trips. 164th Ave. is also used as designated bikeway from Redmond Way to north of 85th St., based on the Redmond City Center Bicycle Plan.

166th Ave. NE
166th Ave. is a four-lane roadway designated as a collector arterial. This north-south facility connects the "Education Hill" community to downtown and to major freeways such as SR-520. The posted speed limit is 25 to 35 mph within the study area. During peak periods, traffic volumes on 166th Ave. are significant, primarily due to directional flow patterns with heavy southbound flow in the morning and heavy northbound flow in the evening.

NE 85th St.
85th St. is a four-lane minor arterial oriented east-west that carries moderately high levels of traffic during peak commute periods. The posted speed limit is 35 mph within the study area. Travel demands on 85th St. are a combination of destination trips and pass-through trips, with a large portion of traffic connecting to/from 164th Ave. and 166th Ave. for access to communities to the north. This roadway is also designated as a bikeway in the Redmond City Center Bicycle Plan between 154th Ave. (west end) and 166th Ave. (east end).

NE 90th St.
90th St. is a four-lane principal arterial that runs parallel to NE 85th St. and carries moderate to high levels of traffic during peak congestion periods. The posted speed limit is 35 mph within the study area. Travel demands on 90th St. are similar to 85th St., but with potentially greater pass-through trips due to the westerly connection to 148th Ave. Access to communities north of downtown is made via 164th Ave. and Willows Rd to the west. This roadway is also designated as a proposed bikeway in the Redmond City Center Bicycle Plan.

Avondale Way
Avondale Way is a collector arterial that varies in orientation and lane configuration. Two to four lanes are provided between Redmond Way and SR-520 and the speed limit is posted as 35 mph. Peak-hour traffic volumes on Avondale Way are moderately high, due in part to the fact that it connects downtown (via Redmond Way and Cleveland St.) to various communities in the Novelty Hill area. As such, travel demands consist of both local and pass-through trips. This roadway is also designated as a proposed bikeway in the Redmond City Center Bicycle Plan.

Intersections Analyzed

This transportation study investigated a number of intersections along these roadways, many of which are considered critical gateway locations such as Avondale Way/79th Ave., Redmond Way/Bear Creek Parkway, and Redmond Way/Cleveland St./160th Ave. NE. The major intersections included and evaluated in this study are listed in Table 2 below.

Table 2 - List of Signalized Study Intersections

Redmond Way & 159th Place	Cleveland St. & Leary Way
Redmond Way & 160th/Cleveland St.	Cleveland St. & 164th Ave.
Redmond Way & Leary Way	Cleveland St. & 166th Ave.
Redmond Way & 164th Ave.	NE 80th St. & 164th Ave.
Redmond Way & 166th Ave.	NE 85th St. & 160th Ave.
Redmond Way & 168th Ave.	NE 85th St. & 161st Ave.
Redmond Way & Avondale Way	NE 85th St. & 164th Ave.
Redmond Way & 170th Ave.	NE 85th St. & 166th Ave.
Leary Way & 159th Place	NE 90th St. & 160th Ave.
Leary Way & Bear Creek Parkway	NE 90th St. & 164th Ave.
79th Ave. & 170th/Avondale Way	SR-202 (Redmond) & SR-520 Ramps

Note: Stop-control intersections were not analyzed as part of the study

Travel Characteristics

Traffic patterns within the downtown area are diverse in terms of general trip distribution, directional flow, and trip type. The downtown core is surrounded by several neighboring communities to the east, west, and north and is connected by various arterial "spokes" which radiate out toward these communities. As such, the downtown serves as a control node or "hub" for various competing traffic streams. Also, like most areas in the region, peak-hour travel in Redmond is characterized by a directional commute emphasis. Heavier westbound flow typically occurs during the morning commute hours and heavier eastbound flow occurs in the evening. Adding further complexity to these hub-like and directional conditions is the fact that downtown traffic streams are comprised of both destination trips and pass-through trips. Destination trips would comprise local trips that access the downtown to satisfy a

primary trip purpose, and pass-through trips would consist of traffic intended for points outside of downtown and originating from outside of downtown. The majority of "pass-through" traffic uses SR-520 to access neighborhoods to the north and east such Novelty Hill and Union Hill. However, during the morning and evening peak hours, SR-520 carries up to 6,000+ vehicle trips, which is typically well beyond what the facility can handle. Due to these high volumes, significant levels of congestion occur during peak commute periods and trips often divert to the local street system to bypass extensive queues on SR-520.

Currently, the focus of the transportation system in downtown is the Redmond Way/Cleveland St. one-way couplet, which serves as the primary east-west backbone through the city's core and accommodates a mixture of drivers passing through the system and stopping in downtown. During peak traffic periods such as the AM and PM peak hours, the one-way couplet carries the bulk of east-west volumes (3,000+ vph) into and through downtown. Aside from various downtown destinations (i.e. retail, services, restaurants, etc), eastbound traffic on Redmond Way/Cleveland St. is generally directed to/from the east and northeast toward the Novelty Hill and Union Hill neighborhoods, and westbound traffic is distributed heavily to/from the west (toward Kirkland) and north, with a large portion of trips passing through Redmond to points beyond. Northbound and southbound traffic within the downtown area is channeled through Leary Way, 164th Ave., and 166th Ave. because these arterials comprise the primary north-south routes through and into town. Traffic along 164th Ave. is generally distributed to/from northerly communities such Woodinville, and traffic along 166th Ave. is typically directed to/from neighborhoods in the "Education Hill" area.

Based on travel demand model forecasting estimates for existing PM peak-hour conditions, approximately half of the drivers on downtown streets are downtown-bound and the remaining half are merely passing through downtown to other destinations. Bear Creek Parkway is currently used as an alternative to SR-520 and carries a high proportion of pass-through traffic, particularly during the PM peak hour. This is a result of SR-520 backing up toward the West Lake Sammamish Parkway ramps, thereby enticing some drivers to re-route to arterial alternatives such as Bear Creek or Cleveland St. Bypass rerouting to Redmond Way or Bear Creek in the AM peak hour is less dramatic than during the PM peak hour, due to the less convenient (and less efficient) access to these alternative streets.

Traffic Circulation

Existing traffic conditions in the downtown area were quantified based on three evaluation measures that collectively attempt to describe overall congestion levels and operations. These measures include a system performance index, level-of-service (delays), and corridor travel times. The main objective of this exercise was to establish an analysis model for which comparisons to future alternatives could be made. This evaluation involved the use of the Synchro/SimTraffic traffic analysis and simulation package described previously in the methodology section. An extensive data collection effort was conducted to gather information related to the transportation analysis. This information included roadway geometry data, transit route data, an inventory of pedestrian/bicyclist facilities, and peak-hour manual traffic counts. Existing traffic conditions, with respect to each of the three performance measures, are described below.

System Performance Index

The system performance index (PI) provides a gross measure of vehicle congestion within the modeled network and attempts to describe overall conditions of the traffic circulation environment. The performance index combines intersection delays, the number and frequency of stops, and the impacts of queuing into a single non-unit index representing all traffic streams in the system. Although difficult to qualify in terms of real world traffic behavior, the PI gives a reference point with which to compare various alternatives. This is especially useful for comparisons between the No-Action option and the Concept to determine the effects of the various changes in the Concept street network. One should note that the PI includes delays and queues that may occur under saturated or overly congested conditions. Thus, the inclusion of any failing links or nodes may skew the PI results to some degree. Nonetheless, the PI provides a reasonable estimate of traffic conditions for comparison purposes. Based on the SimTraffic results, the PM peak-hour performance index for existing conditions is approximately 1,000. Compared to year 2020 conditions for the No-Action option and the Concept, this value is considerably lower and implies reasonably low delays and modest intersection queuing for the downtown street system.

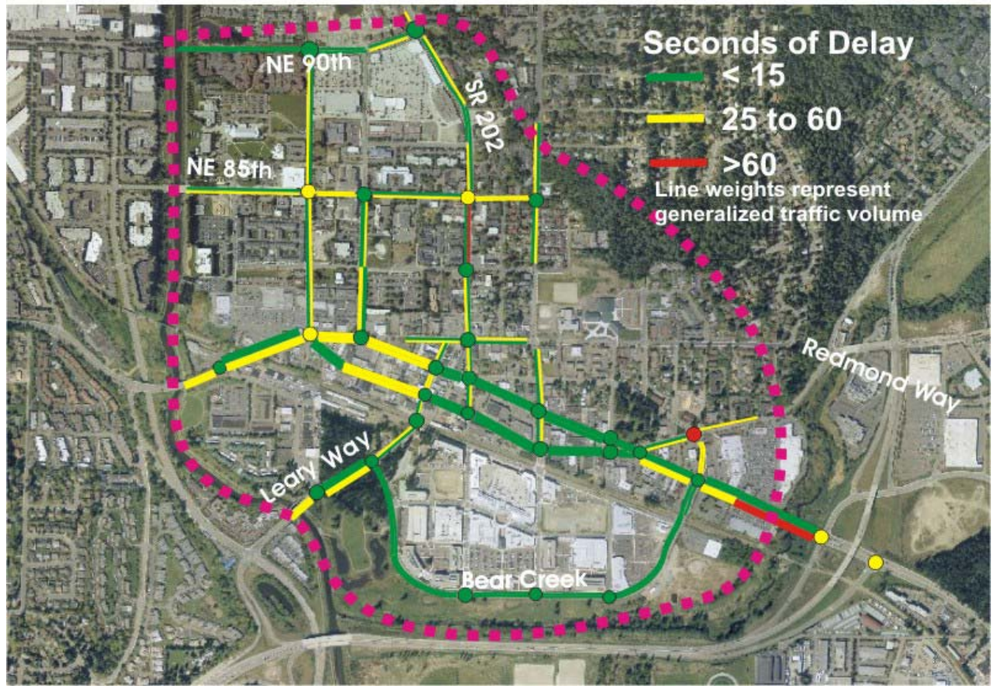
Intersection Level of Service (LOS) and Approach Delay

An intersection-level traffic analysis was made to evaluate the operational characteristics of the downtown area in more detail and to identify any major congestion points that may occur during the peak hour. The goal of this work was to develop a map of approach delays and levels of service for the study area, showing current peak-hour traffic conditions by intersection approach. As discussed previously in the methodology section, level-of-service (LOS) is a measure of congestion used to described the operational characteristics of transportation elements such as highways, ramps, and in this case signalized intersections. The criteria and thresholds for signalized intersection LOS are based on a letter-grade system, with LOS A translating to low delays and LOS F representing levels ranging from high delays to gridlock.

The primary analysis tool used to evaluate congestion levels and intersection delay was the Synchro/SimTraffic simulation and analysis package, also discussed previously. This tool was used to analyze the field-collected traffic data in accordance with procedures outlined in the 2000 Highway Capacity Manual (HCM). Figure 4 summarizes the results of this operational analysis in terms of approach delays and overall intersection congestion.

As shown in Figure 4, most approaches within the downtown area currently operate with only minor to moderate levels of delay in the PM peak hour. Links carrying major traffic loads such as Redmond Way, Cleveland St., Leary Way, and Bear Creek Parkway generally show delays between 25 and 60 seconds per vehicle, translating to a level of service range of C to E (LOS E represents the capacity of an intersection). Despite these benign results, peak-hour delays for the intersection of 79th Ave./Avondale Way and the eastbound approach for SR-202 at the SR-520 fall in the LOS F range. Nonetheless, the overall results indicate that the majority of segments in the downtown core operate at generally low to moderate levels of congestion and that the system does not experience high levels of delay (typically represented by LOS F) or extended periods of gridlock. Field observations of peak-period traffic between 4 PM and 6 PM reveal similar operational behavior and traffic flow characteristics to those modeled in the simulation.

Figure 4
Existing Intersection and Approach Delay



Corridor Travel Time

Corridor travel times were evaluated and summarized as part of the transportation analysis in an effort to develop a more concrete measure of traffic friction and performance along the various arterials. Travel time is an easily understood measure of traffic flow that can be used for preliminary comparisons between alternatives. Combined with other measures such as system delay and level of service, travel time is a reasonably sound indicator of traffic congestion and delay conditions. Several travel paths/routes were examined in order to capture the more-frequently traveled corridors in the downtown network.

The routes chosen for this effort include eastbound and westbound routes along Redmond Way/Cleveland St. from 159th Place to SR-202, northbound and southbound routes along Leary Way and 164th Ave., and eastbound and westbound routes on Bear Creek Parkway from Leary Way to SR-520. These are summarized below.

Route 1
Northbound Leary Way and 164th Ave. from West Lake Sammamish Pkwy to NE 90th St.

Route 2A
Eastbound Redmond Way/Cleveland St./Bear Creek Parkway from 159th Place to SR-520 westbound on-ramp (compares three potential routings).

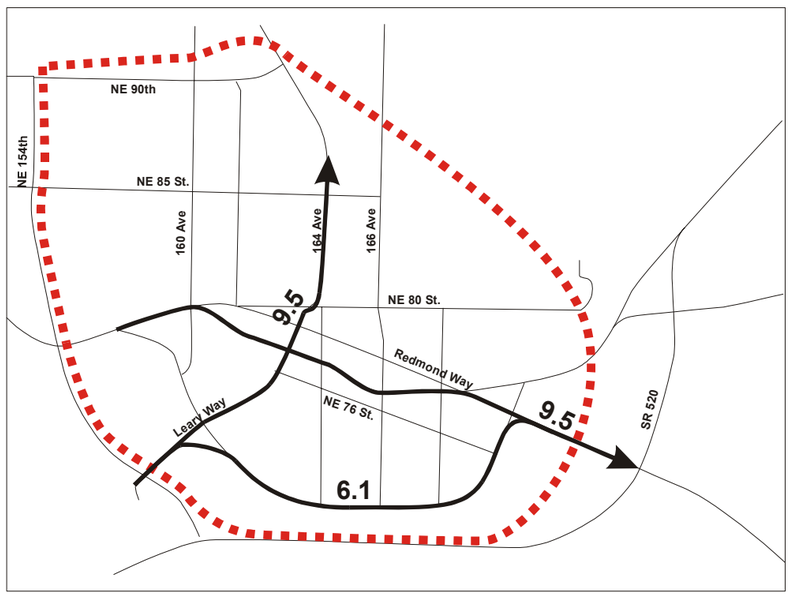
Route 2B
Westbound Redmond Way/Cleveland St./Bear Creek Parkway from SR-520 westbound on-ramp to 159th Place (compares three potential routings).

Route 3
Northbound Leary Way/Bear Creek/Redmond Way from West Lake Sammamish Pkwy to SR-520 westbound on-ramp.

Route 4
Northbound 166th Ave. from Cleveland St. to NE 85th St.

PM peak-hour travel times for these routes are summarized in Figure 5 on the following page. As shown in this figure, travel times for the eastbound Redmond Way/Cleveland St. route are higher than for the opposing westbound direction on the same general route. This is due to the higher peak-hour volumes in the eastbound direction and diversion to local streets (as SR-520 by-pass routes) by commuters. This follows the basic directional commute pattern described previously, which indicated a westbound emphasis in the morning and an eastbound push in the evening. Travel time along Route 3 is low in comparison due to the absence of signals along Bear Creek Parkway.

Figure 5
Existing Corridor Travel Times



NO ACTION CONDITIONS

Roadway Network

The roadway network for the future No-Action option is similar to the network used for existing conditions, with the exception of specific short-range capital improvements. Of particular importance for this alternative is the assumption that no widening improvements are in place for the SR-520 corridor by the Year 2020 No-Action horizon. As such, in the No-Action scenario SR-520 remains a two-lane facility near the SR-202 (Redmond Way) interchange ramps (one lane in each direction), with auxiliary lanes and on/off ramps as they exist today. This assumption stems from the notion that changes to the street network for the "Build" condition would rely on improvements to SR-520 as a means for attracting greater pass-through traffic to the freeway mainline, thereby enhancing the overall effectiveness of the proposed local arterial network modifications. Only minor changes to the street system are included in the No-Action alternative, as compared to the existing network with the exception of the addition of the NE 90th Street Bridge. Minor changes are related to installation of new signals at the following locations:

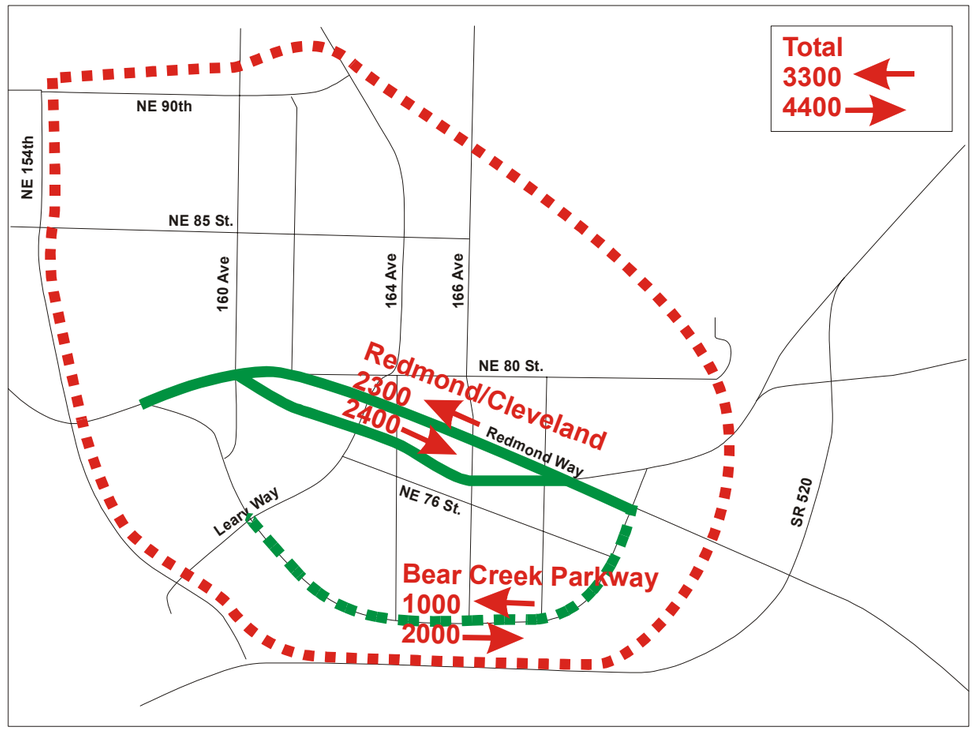
- NE 80th St. & 166th Ave. NE
- NE 83rd St. & 166th Ave. NE
- SR-202 & Bear Creek Village Retail Driveways

These signals have been identified in Redmond's short-range Transportation Improvement Program (TIP) and would likely be installed by 2004. The remainder of the major TIP projects such as the 160th Ave. extension to SR-202, the 164th Ave. NE connection to Town Center, the West Lake Sammamish Parkway to Bear Creek connection (second river crossing), and the 161st Ave. extension to Cleveland St. and 76th St., etc. are not included in this network. The intent was to represent a relatively "true" No-Action alternative in order to fairly assess the impacts of background growth alone (compared to Existing Conditions), and provide a consistent frame of reference for further comparisons to the Concept Plan.

Travel Characteristics

With no major changes to the downtown street system assumed for the No-Action alternative, changes in overall traffic patterns and arterial distributions would occur primarily as a result of future changes in land use. To determine how such changes in land use affect travel patterns, traffic forecasts were developed using the Redmond version of the Bellevue/Kirkland/Redmond (BKR) Travel Forecasting Model. This model was used as the basis for future No-Action traffic volumes and also provided the foundation for trip distribution patterns throughout the street network. To maintain some level of consistency with existing count volumes, future No-Action traffic volumes were developed using growth rates from the BKR model. These No-Action growth rates reflect annualized background traffic growth between 1999 (calibrated) model volumes and future 2020 model volumes. Growth rates were then applied to the existing peak-hour count volumes to determine future No-Action volumes. Due to minor imbalances in growth rates and occasional network irregularities, some post-processing of the volumes was required. This involved increasing or decreasing future volumes to match those of adjacent intersections. This process insured reasonable traffic flow consistency along arterials.

Figure 6
No Action Traffic Volumes



No-Action PM peak-hour traffic volumes for the two major east-west arterials through downtown are summarized in Figure 6 above. These volumes comprise the bulk of total traffic loads on the downtown street system during peak-hour periods. Compared to existing conditions, these future volumes are approximately 50 to 60 percent higher. Trip distribution patterns in the future No-Action alternative do not change significantly compared to existing conditions. The majority of traffic demand continues to use the key east-west arterials such as Redmond Way, Cleveland St., Bear Creek Parkway and north-south routes such as 164th Ave. and 166th Ave. for access to surrounding communities.

Existing east-west commute patterns generally remain intact, with a directional emphasis on eastbound flow in the evening. Pass-through traffic continues to divert to local arterials, with greater dependence on Bear Creek Parkway in the No-Action alternative due to higher congestion levels along Redmond Way/Cleveland St. and the SR-520 corridor.

The primary difference between existing traffic conditions and No-Action conditions is the number of pass-through trips versus the number of destination trips. Based on traffic forecasts, increased land use density in the downtown core translates into more destination trips, even during peak commute periods. In fact, the ratio of destination to pass-through trips increases from 1 to 1 to 1.5 to 1.

Traffic Circulation

System Performance Index

As described in the Existing Conditions section, the system performance index (PI) provides a gross measure of congestion within the modeled network and is used to describe overall conditions of the traffic circulation environment. For the year 2020 No-Action alternative, the performance index is estimated at 10,000 for the PM peak hour, based on the SimTraffic simulation results. As discussed previously, this measure includes delays and queues that may occur under saturated or overly congested conditions. Thus, inclusion of any failing links or nodes may skew the PI results to some degree. For existing conditions, this issue is not particularly critical since the vast majority of links and nodes currently operate at reasonably low levels of delay. However, for the No-Action scenario several intersection movements fail, due to the substantial increase in traffic volumes (more than double that of existing conditions in many locations) and the fact that no major capacity improvements are assumed to occur in the future. As such, the PI is considerably higher for the No-Action alternative than for existing conditions.

Intersection LOS and Approach Delay

An intersection-level traffic analysis was conducted for the No-Action alternative to assess the impacts of background traffic growth on the downtown transportation system. As with the existing conditions evaluation, the primary analysis tool used to examine peak-hour congestion levels and intersection delay was the Synchro/SimTraffic simulation and analysis package. Figure 7 on the following page summarizes the results of this operational analysis in terms of approach delays and overall intersection congestion.

As shown in Figure 7, a wide range of delays and congestion levels would be expected for the No-Action scenario. The results indicate that several approaches within the downtown area would operate with high delays while others would show only light to moderate congestion. Links carrying major traffic loads such as Redmond Way, Cleveland St., Leary Way, and Bear Creek Parkway generally show delays between 25 and 60 seconds per vehicle, translating to a level of service range of C to E, while some north-south segments of 164th Ave. would likely fail during the PM peak hour and result in gridlock conditions. Other areas of potentially heavy congestion include the 85th St. corridor from 154th Ave. to 166th Ave., specific SR-202 (Redmond Way) segments near the intersection with SR-520 on-off ramps, and the Avondale Way approach to downtown. Compared to existing conditions, these intersection-level analysis results indicate significantly higher delays and much greater potential for gridlock conditions.

Corridor Travel Time Summaries

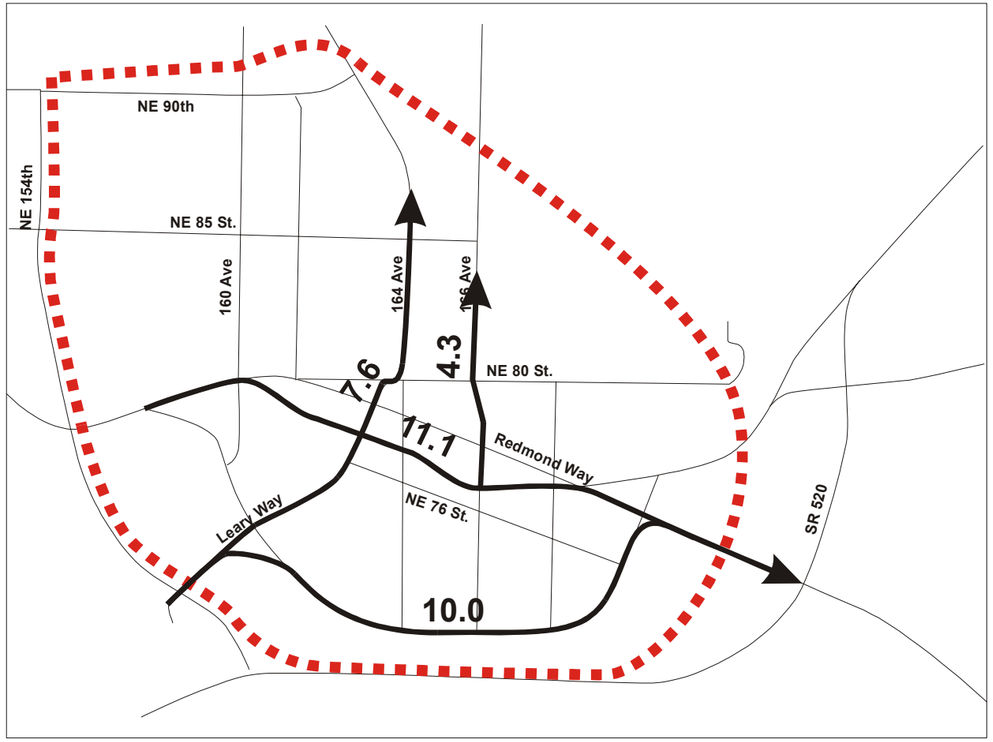
No-Action corridor travel times were evaluated for a variety of routes through and around the downtown core. These travel routes were similar to those included in the existing conditions travel time summary and were again targeted to capture the most frequently traveled corridors in the downtown network, i.e. those most affected by background growth in peak-hour traffic.

Figure 7
No Action Intersection and Approach Delay

To recap, these routes include eastbound and westbound routes along Redmond Way and Cleveland St. from 159th Place to SR-202, northbound and southbound routes along Leary Way and 164th Ave., and eastbound and westbound routes on Bear Creek Parkway from Leary Way to SR-520. PM peak-hour travel times for these routes are summarized in Figure 8.

As shown in this figure, travel times for the eastbound Redmond Way/Cleveland St. route are again higher than for the opposing westbound direction on the same general route. This is due to the higher peak-hour volumes in the eastbound direction and diversion to local streets (as SR-520 by-pass routes) by commuters, and is more exaggerated in the No-Action alternative (compared to existing conditions) due to the higher base volumes. Directionality is maintained which emphasizes eastbound flow in the evening. Travel time along Route 3 (northbound Leary Way to Bear Creek Parkway to SR-202) is significantly higher than in the existing conditions scenario, due to high delays for northbound right-turn traffic at the major Redmond Way/Bear Creek Parkway/170th Ave. intersection. Results for this route indicate a 60 to 70 percent increase (6 minutes versus 10 minutes) in travel time over existing conditions. Differences for the heavily traveled Redmond Way route are less noticeable, but still show an increase of 15 to 20 percent. Differences for the northbound Leary Way to 164th Ave. route are modest (7.5 minutes existing versus 7.6 minutes No-Action).

Figure 8
No Action Corridor Travel Times



CONCEPT CONDITIONS

Roadway Network

For the purpose of analysis, several changes to the No Action option street network were assumed that generally respond to the ideas outlined in the Concept, as presented at the workshop in January 2002 and shown in Figure 3.

Figure 3 illustrates the key changes to the No Action option street network. Other minor changes to the network were also assumed-- such as the addition of turn pockets where appropriate.

Principle modifications to the street network included:

- General Assumption: unless otherwise specified, downtown streets were assumed to be local access streets with one travel lane in each direction.
- SR-202 – NE 90th St. to Redmond Way: The micro simulation model assumed a three-lane configuration* (one lane in each direction with a continuous left-turn lane).
- 166th Ave. NE – NE 90th St. to Redmond Way: The micro simulation model assumed a three-lane configuration* (one lane in each direction with a continuous left-turn lane.)
- NE 85th St. - Sammamish River to 166th Ave. NE: The micro simulation model assumed a three-lane configuration* (one lane in each direction with a continuous left-turn lane.)
- Redmond Way – NE 170th Ave. to BNSF: the one-way couplet westbound leg is replaced with one-lane in each direction, with channelization at intersections.
- Cleveland St. – Redmond Way to Redmond Way: The one-way couplet eastbound leg is replaced by a local access street, with one-lane in each direction.
- 160th St. – Redmond Way to 159th Place NE: New connection as a collector street with one lane in each direction.
- 164th St. – Cleveland St. to NE 76th St.: New connection as a collector street with one lane in each direction.
- 168th St. – Redmond Way to NE 76th St.: New connection as local access street with one lane in each direction.
- SR 520 – East Lake Sammamish Parkway to Novelty Hill Road: Two general-purpose lanes in each direction (Translake preferred option).
- Bear Creek Parkway: New connection from Leary Way to Redmond Way and expansion to two lanes in each direction.

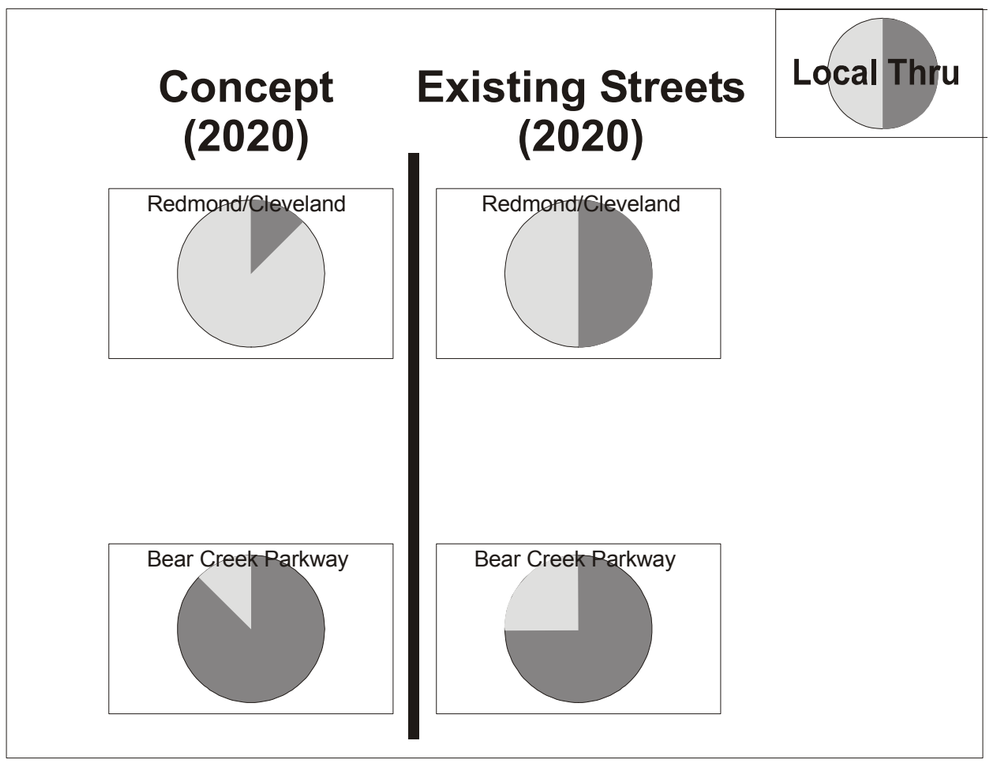
* This is a conservative configuration assumption made prior to the City Council's adoption of the plan. It is recognized that detailed analysis on a street-by-street basis would need to be conducted to confirm the appropriateness of narrowing from four to three lanes for a given facility.

Travel Characteristics

Three screenlines near downtown were chosen to assess changes in travel characteristics. These screenlines included the former Redmond Way and Cleveland St. couplet, Bear Creek Parkway, and SR 520.

Results from the City of Redmond demand-forecasting model and the subsequent micro-simulation model runs suggest a change in travel characteristics in response to the network changes envisioned by the Concept. Added capacity, improved connections, and attractive travel times compared to other routes is expected to attract a high percentage of through-trips to Bear Creek Parkway. The attractiveness of Bear Creek Parkway as an alternate route is further enhanced by reduced capacity and slower travel speeds on Redmond Way and Cleveland St. As can be seen in Figure 9, under the Concept approximately 80% of trips on Bear Creek Parkway are forecast to be through-trips while the reverse occurs on Redmond Way and Cleveland St., where 80% of trips are forecast to be local. Under the No Action option, 75% of trips on Bear Creek Parkway are through-trips while only 50% of trips on Redmond Way and Cleveland St. are local.

Figure 9
Local vs. Through Traffic: 2020 Concept and No Action



As shown in Figure 10, PM peak-hour traffic volumes for the Concept on Redmond Way and Cleveland St. are forecast to be approximately 3,000 vehicles per hour. This is a 36 percent reduction from the 4,700 vehicles per hour projected for the No Action option on these facilities. Only a slight directionality exists, with eastbound lanes handling approximately 1,600 vehicles compared to 1,400 in the westbound direction. In contrast, Bear Creek Parkway experiences a notable directional emphasis in the eastbound direction (2,400 eastbound vs. 1,500 eastbound). This is consistent with the earlier finding that Bear Creek Parkway is likely to experience a preponderance of through-traffic. With 2,400 vehicles per hour in the eastbound direction, Bear Creek Parkway accommodates significant volumes of traffic and is at the upper limit of capacity for a five-lane arterial with relatively few signalized intersections. Also of note is a 30 percent increase in overall projected traffic on Bear Creek Parkway in the Concept (3,900 vph in both directions), as opposed to the No Action option (3,000 vph in both directions).

The forecast traffic volume on Redmond Way and Cleveland St. (approximately 3,000 in both directions) is similar to the existing traffic volumes (3,200 for the two streets). Therefore, the capacity improvements envisioned for Bear Creek Parkway and SR 520 serve two purposes: 1) accommodating future growth in traffic, and 2) encouraging segregation of through-traffic from local traffic.

Figure 10
Traffic Volumes: Concept

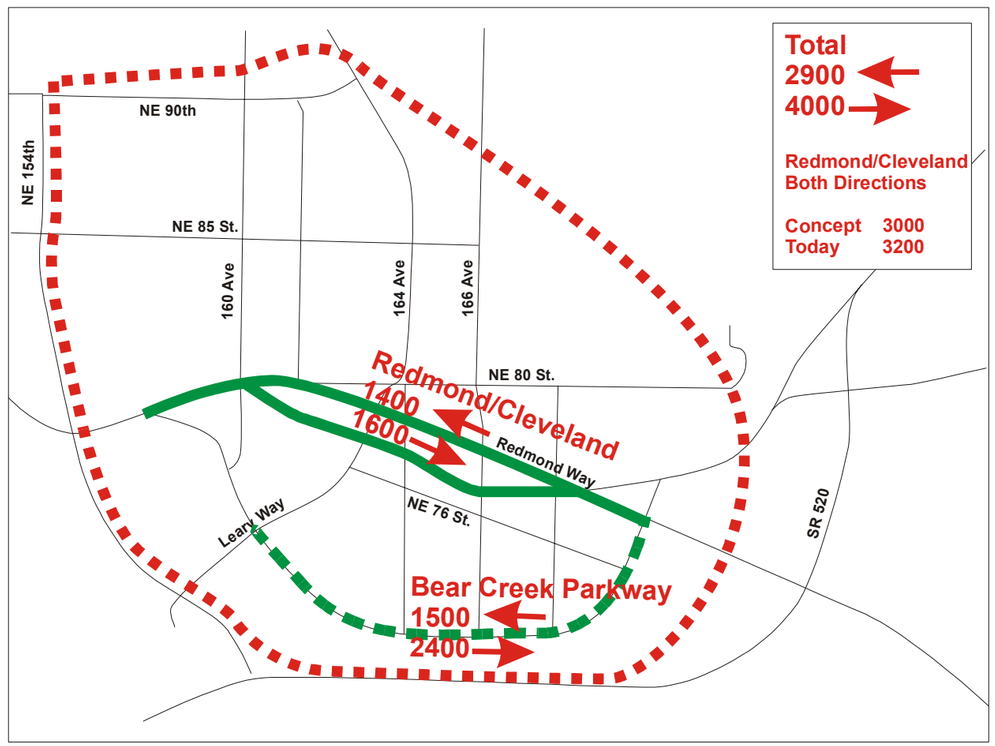
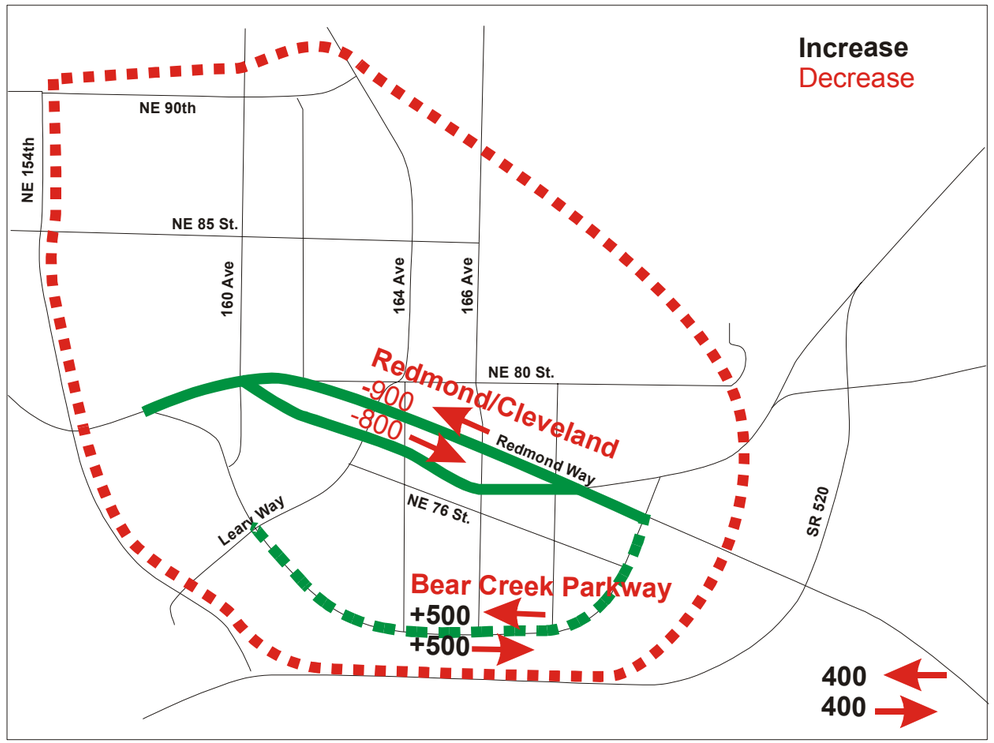


Figure 11
Change in Traffic Volumes: Concept vs. No Action



Changes in traffic volumes on Redmond Way, Cleveland St., Bear Creek Parkway and SR 520 parallel the changes in the nature of trips using these facilities. Reductions in traffic of 1,700 in the PM peak hour in both directions on Redmond Way and Cleveland St. is closely mirrored by commensurate increases in traffic volumes on Bear Creek Parkway and SR 520. Although changes to the road network have caused redistribution throughout the system, the three screenlines chosen suggest a strong link between changes to the former Redmond Way and Cleveland St. couplet and impacts to Bear Creek Parkway and SR 520.

The results indicate that SR 520 and Bear Creek Parkway share a similar burden for accepting traffic diverted from Redmond Way and Cleveland St. as a result of capacity changes. To assess the interrelationship and dependence of the Concept on these two facilities, a sensitivity test was conducted whereby capacity improvements to SR 520 were removed from the forecast. Predictably, congestion worsened on downtown streets, but only modestly. The conclusion of this sensitivity test was that improvements to SR 520 were important for implementation of the Concept, but that they were not necessarily critical to its success. In other words, the Concept and the elements most critical to its success are fully within the City's jurisdiction.

Traffic Circulation

System Performance Index

As described previously, the system performance index (PI) provides a gross measure of congestion within the modeled network and is used to indicate overall conditions of the traffic circulation environment. For the Concept in year 2020, the PM peak-hour performance index based on the SimTraffic simulation results is estimated at 6,100, as compared to 10,000 for the No Action option. The Concept, therefore, represents approximately 39% better overall performance than the No Action option. It should be noted that although this is a significant improvement, under both the Concept and the No Action option, significant overall levels of delay are forecast. Thus, this improvement should not be construed as "congestion relief", but simply that the Concept has some overall performance advantages compared to the No Action option. It should also be noted that the Concept represents significant changes in the street network and consequently changes in the nature and location of congestion.

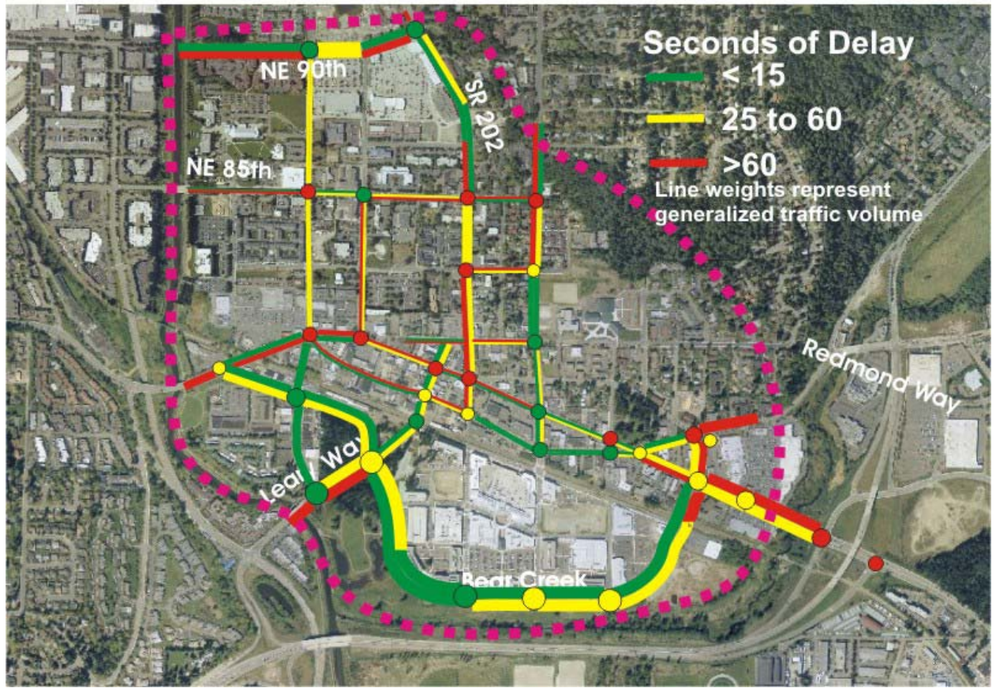
The Ring Road envisioned in the Concept has some capacity enhancements over the No Action option, and as a result it is likely that a significant portion of the system performance degradation in the No Action option may be a result of vehicles being denied entry to the system. The queuing impacts on traffic entering the downtown have not been fully evaluated, because this is outside the focus of the downtown. A Transportation Master Plan at the city-wide scale would further analyze traffic conditions on approaches to the downtown.

Intersection LOS and Approach Delay

Figure 12 provides an overview of intersection and approach delay under the Concept for PM peak-hour conditions in the 2020 forecast year. Three clear patterns emerge: 1) Major gateway intersections to the downtown are generally improved under the Concept, 2) Bear Creek Parkway experiences similar levels of delay when comparing the Concept to the No Action option, but carries substantially higher volumes of traffic (approximately 1,000 more vehicles), and 3) Reduced capacity in the area of the former Redmond Way and Cleveland St. couplet results in higher levels of congestion in the downtown core.

Similar to the No Action option, significant approach delays are experienced for vehicles entering the downtown. However, the Concept shows either improved or similar conditions at the major gateway intersections. NE 90th St. shows improved intersection performance at 164th Ave. NE and at 160th Ave. NE due largely to fewer northbound vehicles taking a left onto NE 90th St. This suggests that the model predicts that vehicles are avoiding the downtown and instead are using the ring road. Under the No Action option, congestion at the NE 90th St. and 164th intersection influences the intersection of NE 90th and 160th St. Therefore, with improved operations at 164th under the Concept, the NE 90th St. and 166th intersection also improves.

Figure 12
Concept - Intersection and Approach Delay



The intersection of Redmond Way and 159th Place NE at the eastern gateway to downtown also improves significantly under the Concept. With a new link to Bear Creek Parkway via free right-turn channelization, a significant number of vehicles (approximately 1,500) moving eastbound to Bear Creek Parkway experience no direct intersection delay related to the 159th Place intersection.

At the Leary Way Gateway (159th Place and Bear Creek Parkway intersection) conditions are similar or slightly degraded when comparing the Concept with the No Action option. The intersection of Leary Way and Bear Creek Parkway experiences higher delays, due to the new leg added to the intersection and the significant volumes of new traffic passing through the intersection. However, despite the creation of a major intersection, vehicle delay at this location is relatively modest.

At the eastern gateway to downtown, in the vicinity of Redmond Way and NE 170th Ave. NE conditions are generally similar or somewhat improved when comparing the Concept with the No Action option. Conditions improved due to capacity improvements, specifically free-right turns from northbound 170th Ave. NE to eastbound Redmond Way and from northbound 170th Ave. NE to eastbound Avondale Way.

Bear Creek Parkway experiences levels of delay similar to the No Action option, butcarries significantly higher volumes of vehicles. Some degradation of intersection level-of-service is projected in the vicinity of Redmond Town Center at 164th and 168th Avenues due to the difficulty in exiting the shopping center given the higher levels of traffic on Bear Creek Parkway.

Within the downtown core, conversion of the couplet to two-way operation is expected to result in reduced capacity and higher levels of congestion on Redmond Way and Cleveland St., which also influences traffic operations on north-south streets. Traffic volumes on the former couplet are expected to significantly decrease, by approximately 1,700 vehicles when compared to the No Action option. Visual observation of SimTraffic confirms that although higher levels of delays and queuing occur in the vicinity of the couplet, traffic flow is stable and vehicles are able to move through the system.

Figure 13 shows that some portions of 166th Ave. NE showed an improvement with respect to travel delay under the Concept as compared to the No Action option, while other portions showed an increase in delay or degradation. For the sections where travel delay decreased, the improvement is due to a shift in traffic patterns and the ability of the three-lane section in the Concept to better accommodate left-turning vehicles. The degradation occurred in locations where left turns were relatively low and the four-lane No Action configuration could better accommodate through volumes. Overall travel times for the Concept and No Action option in the peak direction (northbound) on 166th Ave. NE between Redmond Way and NE 85th St. are similar (4.5 vs. 4.3 minutes respectively). Under the Concept, 166th Ave. NE is designated as a pedestrian connector. Conversion from four to three lanes would allow for substantial improvement to sidewalks that are currently inadequate in this area, while resulting in only a modest degradation in level-of-service for motorized vehicles.

Figure 13
Difference in Delay Conditions Between Concept and Baseline

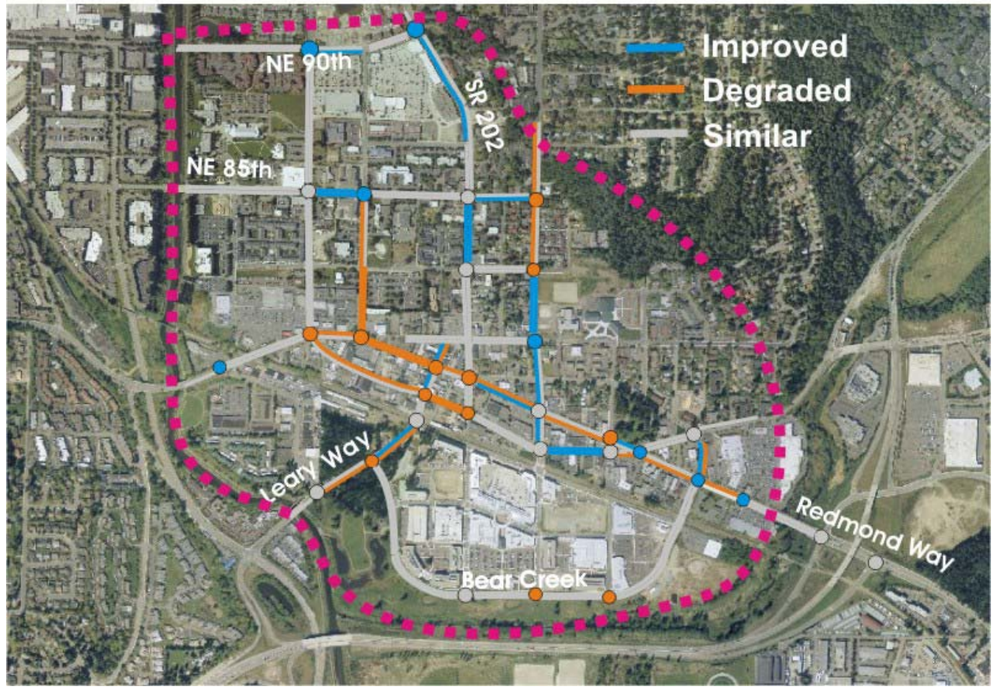
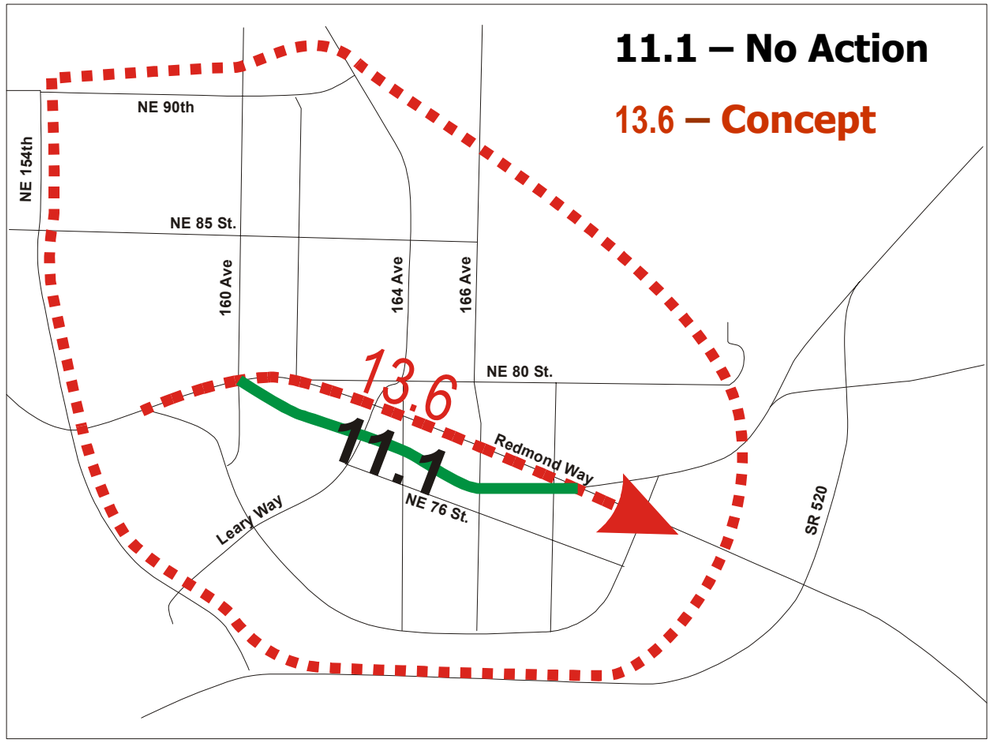


Figure 14
Travel Time Comparison –
Eastbound Redmond Way vs. Cleveland Street



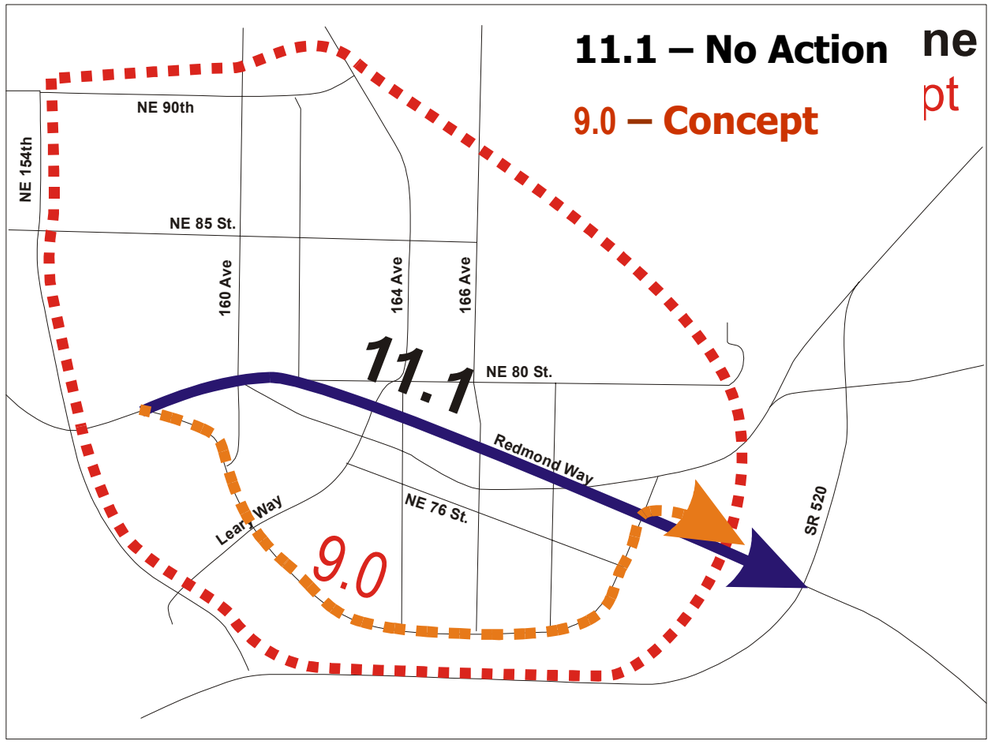
Corridor Travel Time Summaries

The following section provides a series of travel-time comparisons for selected routes through the downtown, focusing on Bear Creek Parkway and the Redmond Way and Cleveland St. couplet. Travel time is the total time need to travel the route, assuming a fixed speed over the route distance and factoring in intersection delay associated with each movement.

Conversion of the downtown couplet to two-way operation results in lower capacity and higher levels of congestion, which predictably increases travel times along the length of the Redmond Way/Cleveland St. corridor through the downtown. Figure 14 shows a comparison of eastbound travel time through downtown from 159th Place NE to the SR 520 ramps off of Redmond Way. In the Concept, using a two-way Cleveland St., travel times increase moderately by about 2.5 minutes (13.6 vs. 11.1 minutes) over the No Action option (assuming a route utilizing a one-way Cleveland St.). Comparing a two-way Redmond Way under the Concept with the route using a one-way Cleveland St. in the No Action option shows similar results, with an increased travel time of 1.9 minutes (13.0 vs. 11.1).

Figure 15 compares travel times for through-traffic on Bear Creek Parkway under the Concept with the Redmond Way/Cleveland St. couplet under the No Action option. This illustrates that Bear Creek Parkway under the Concept option provides a noticeable travel advantage of about 2 minutes over the No Action couplet.

Figure 15
Travel Time Comparison (minutes)–
Eastbound Redmond Way vs. Bear Creek Parkway



Comparing travel times for Bear Creek Parkway under the Concept and No Action option shows very similar results of 9.6 minutes, compared to 10.0 minutes under the No Action option (see Figure 16). Under the Concept option, Bear Creek Parkway experiences travel times slightly improved over the No Action option while carrying significantly higher volumes of traffic (approximately 1,000 more vehicles per hour).

Figure 16
Travel Time Comparison (minutes) Eastbound – Bear Creek Parkway

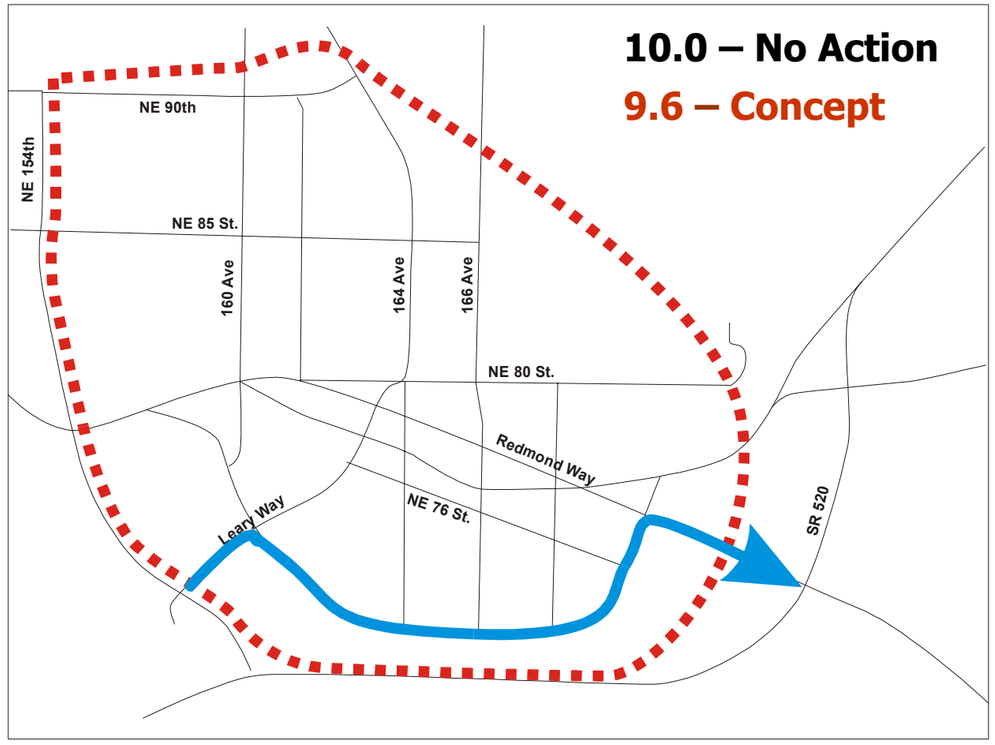


Figure 17
Travel Time Comparison (minutes): Northbound 166th Ave. NE

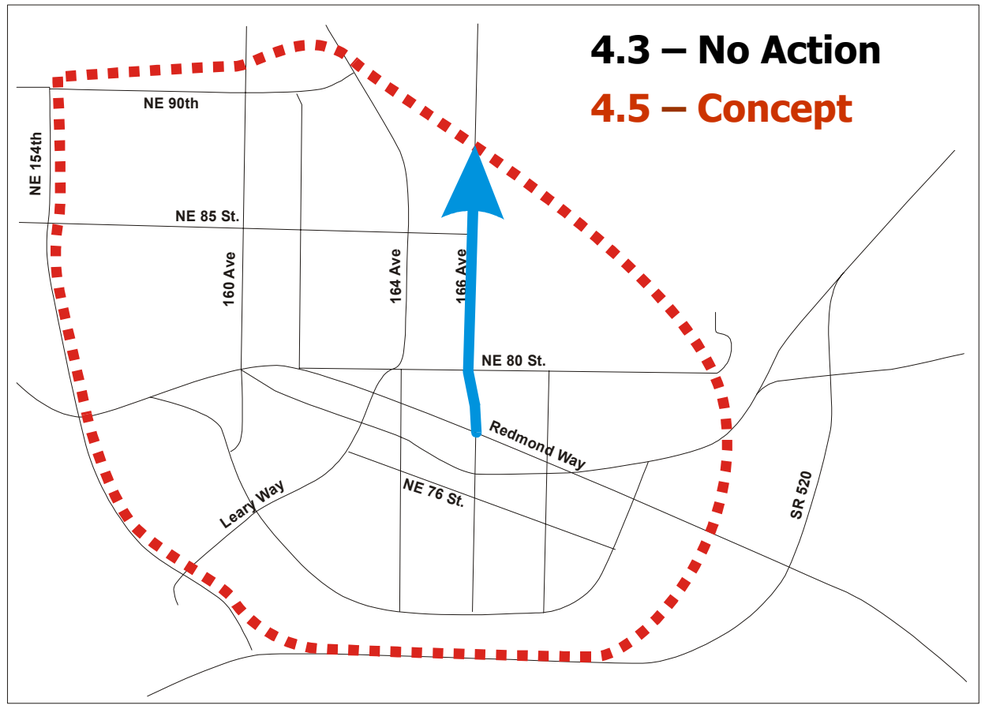


Figure 17 compares northbound travel time on 166th Ave. NE between Cleveland St. and NE 85th St. Travel times are comparable (4.5 vs. 4.3) despite the reduction in lanes under the Concept from four to three lanes.

Conclusion

Overall, the results of the traffic analysis are generally consistent with the objectives that the Concept is designed to achieve. Bear Creek Parkway functions as a viable alternate route that carries high volumes of through-traffic and provides an attractive option to slower moving downtown streets. Major gateway intersections experience improved operations, which fulfills the notion of a strong ring road concept. Redmond Way and Cleveland St. carry a high proportion of local trips, traffic moves slower within the downtown core, and pass-through traffic is discouraged from using downtown streets.

APPENDIX

Exhibit 1: Demand-Forecasting Model Documentation

City of Redmond Travel Demand Model Summary

1. History

- Originated from BKR model developed in early 1990, and was implemented in Emme2 on a Unix platform.
- It has been under continuous refinements since 1994 by RST.
- Converted to UFOSNET in 1998.
- Currently, four version of model are available, 1999 base year, 2003 currency test, 2010 comprehensive plan and 2020 TFP.
- The latest calibration was done in 2000 based on 1999 condition.
- All models were developed for PM peak one hour.

2. TAZ

- Total number of zones is 588. The highest zone number is 616.
- The number of zones breakdown by subareas are: Redmond 130, Kirkland 77, Bellevue 220 and external 161.
- The number of zone breakdown by Redmond TMD are: downtown 54, NE 18, Willows 17, Grasslawn 7, Overlake 16, Viewridge 4 and SE 14.
- See attached TAZ map.

3. Network

- Total number of nodes is 7000. The highest node number is 19000.
- About 20,000 links.
- Include HOV link. No transit network.
- Include intersection information for currency analysis.
- See attached maps for 1999 and 2020 networks.

4. Land Use

- Residential uses are prepared in dwelling units for single-family and multi-family.
- Non-residential uses are prepared in square footage for the following categories: office, retail, industrial, recreational, institution, hotel and special generator.
- Same land use data categories are prepared for BKR cities. No land use data are prepared for the external zones.

5. Trip Generation

- Implemented in a spreadsheet.
- Generate total productions and attractions for four trip purposes: HBW, HBO, NHB and HBSchool.

- Trip generation is calculated only for the three BKR cities. For the external zones, PSRC PA vectors are imported directly.
- See attached table for trip generation coefficients.

6. Trip Distribution

- Based on a Gravity type model.
- Generate PA tables for four trip purposes: HBW, HBO, NHB and HBSchool.
- See attached UFOSNET sample script for HBW.

7. Mode Choice

- Originated from Portland Metro model.
- A multi-nominal logit structure.
- Produces PA table for the following modes: SOV, HOV, Transit and P&R.
- 2020 mode shares were adjusted to meet Redmond CTR targets.
- Implemented in UFOSNET scripts.
- See attached table for the data specification.

8. Peaking

- Used to convert PA to PM 1-hour OD tables.
- See attached table for peaking factors.

9. Assignment

- Used to convert PA to PM 1-hour OD tables.
- SOV and HOV 2-class equilibrium assignment.
- Conical volume delay functions by facility types.

10. LOS Analysis

- Calculated for concurrency analysis for all intersections.
- Used postprocessed turning movement volumes.
- Based on HCM 212 planning method.

Trip Generation: Density Factors

		Employee per Ksqft		Percent Vacancy	
		CBD	NON-CBD	CBD	NON-CBD
Kirkland					
	Office	4.00	4.00	5.00	5.00
	Retail	2.00	2.00	5.00	5.00
	Industrial	1.43	1.43	6.00	6.00
Bellevue					
	Office	3.08	3.64	6.00	6.00
	Retail	2.24	2.06	5.00	5.00
	Industrial	3.84	1.43	6.00	6.00
Redmond					
	Office	4.00	4.00	5.00	5.00
	Retail	2.00	2.00	5.00	5.00
	Industrial	1.43	1.43	6.00	6.00

Hotel Per Room	0.44
School Enrollment	0.10
Institution Per ksqft	0.25
Recreational Per ksqft	0.25

Trip Generation: Trip Rates

Daily Production:

	HBW	HBSc	HBO
SFDU	1.850	0.600	5.790
MFDU	1.600	0.200	3.140

Daily Attraction:

	HBW	HBSc	HBO		NHB/COMV		TOTAL	
			CBD	NON-CBD	CBD	NON-CBD	CBD	NON-CBD
SFDU	0.15	0.00	1.38	1.38	0.57	0.57	2.10	2.10
MFDU	0.15	0.00	0.56	0.56	0.19	0.19	0.90	0.90
Hotel Rooms	0.00	0.00	0.60	0.60	6.00	6.00	6.60	6.60
School Enrollment	0.00	1.50	0.00	0.00	0.16	0.16	1.66	1.66
Office Emp.	1.10	0.00	2.50	2.50	1.60	1.60	5.20	5.20
Retail Emp.	1.20	0.00	9.50	9.50	7.00	7.00	17.70	17.70
Industrial Emp.	1.20	0.00	0.30	0.30	1.10	1.10	2.60	2.60
Other Emp.(Inst., Recr., Hotel)	1.60	*	*	*	*	*	*	*

Mode Choice Model Inputs and Outputs:

	HBW	HBO	NHB
Input Skim Matrices			
Peak Auto Time	x		
Peak Auto Distance	x		
Peak Transit Impedance*	x		
Peak Transit Fare	x		
Peak P&R Impedance**	x		
Peak P&R Auto Time	x		
Off-peak Auto Time		x	x
Off-peak Auto Distance		x	x
Off-peak Transit Impedance*		x	x
Off-peak Transit Fare		x	x
Off-peak P&R Impedance**			
Off-peak P&R Auto Time			
Input Zonal Attributes			
Household Transit Coverage	x	x	
Employment Transit Coverage	x	x	x
Long Term Parking Cost	x		
Short Term Parking Cost		x	x
Auto Bias	x	x	
Density Bias	x	x	x
Terminal Time	x	x	x
Input Constants			
Auto Operating Cost	x	x	x
P&R Auto Operating Cost	x		
Output PA Matrices			
Drive Alone	x		
Shared Ride	x		
Transit	x	x	x
P&R	x		
Drive Alone + P&R		x	x

*Transit Impedance = In_vehicle_Time + Walk_Time * 5.2 + Wait_Time * 1.7
**P&R Impedance = Auto_Time * 2.6 + Transit_Impedance

Peaking Factors:

```
//Auto occupancy rate
UMatrix_Constant("hwsaor", 2.27); //hbw carpool occupancy rate
UMatrix_Constant("hboaor", 1.42); //hbo occupancy rate
UMatrix_Constant("nhbaor", 1.20); //nhb occupancy rate

//Peaking factors for Bellevue
UMatrix_Constant("hbw_pa", 0.012); //hbw pm peaking P to A
UMatrix_Constant("hbo_pa", 0.042); //hbo pm peaking P to A
UMatrix_Constant("nhb_pa", 0.055); //nhb pm peaking P to A
UMatrix_Constant("sch_pa", 0.002); //home based school pm peaking P to A

UMatrix_Constant("hbw_ap", 0.134); //hbw pm peaking A to P
UMatrix_Constant("hbo_ap", 0.060); //hbo pm peaking A to P
UMatrix_Constant("nhb_ap", 0.055); //nhb pm peaking A to P
UMatrix_Constant("sch_ap", 0.0028); //home based school pm peaking A to P

UMatrix_Constant("nhb_tr", 0.38); //nhb transit conversion factor


//Peaking factors for Redmond, Kirkland and Regional
UMatrix_Constant("hbw_pa2", 0.010); //hbw pm peaking P to A
UMatrix_Constant("hbw_ap2", 0.110); //hbw pm peaking A to P

UMatrix_Constant("hbo_pa2", 0.042); //hbo pm peaking P to A
UMatrix_Constant("hbo_ap2", 0.050); //hbo pm peaking A to P

UMatrix_Constant("nhb_pa2", 0.050); //nhb pm peaking P to A
UMatrix_Constant("nhb_ap2", 0.050); //nhb pm peaking A to P

UMatrix_Constant("sch_pa2", 0.002); //nhb pm peaking P to A
UMatrix_Constant("sch_ap2", 0.0028); //nhb pm peaking A to P
```


Trip Distribution Script: HBW

```
//Gravity Model for HBW trips

zones = 700;

UMatrix_Zones(zones);

//declare input matrices

string PROD = "HBWP";
string ATTR = "HBWA";
string AUTT = "autt2"; //congested auto time
string FFAC = "HBW";
string OUTPA= "hbw99_pa";

/*copy zonal data from zone table to array buffer*/

UMatrix_Temp("prod","zonp_"+PROD);
UMatrix_Temp("attr","zona_"+ATTR);
UMatrix_Temp("ffac","ffac_"+FFAC);

//create temporary matrices

UMatrix_Temp("time0",AUTT);
UMatrix_Temp("outpa","");

/*main computation*/

//prepare travel time matrix, adding intrzonal times

if(!UMatrix_Run(""time0" = if((i==j), rowmin("time0")*0.7, "time0")')) return false; //intra time calculation

if(!UMatrix_Run(""time1" = '
            'if((((i<=190)||((j>=191)&&(i<=375)))||((i>=387)&&(j<=450)))&&(i==j)),'
            ""time0"+2, "time0")')) return false; //subarea adjustment

if(!UMatrix_Run(""time1" = '
            'if(("time1" < 0.5), 1, "time1"+0.501)')) return false;

if(!UMatrix_Run(""time1" = int("time1")')) return false;

if(!UMatrix_Run(""time1" = if( (i>616)||(j>616), 0, "time1")')) return false;

if(!UMatrix_Run(""time1" = min(100, "time1") )) return false;

//prepare for matrix balancing

if(!UMatrix_Run(""time" = flookup("time1","ffac")')) return false;

if(!UMatrix_Run(""time" = if( (i>616)&&(j>616), 0, "time")')) return false;
if(!UMatrix_Run(""time" = if( (i==j)&&(i<44)&&(j<44), 0, "time")')) return false;


//run matrix balancing function
if(UMatrix_Balance("time", "outpa", "prod", "attr",100) < 0) return false;


//calculate average trip length
if(!UMatrix_Run(""time2" = "outpa"*"time0"')) return false ;

UMatrix_Temp_Save("outpa", OUTPA);

trips = UMatrix_Temp_Sum("outpa");
times = UMatrix_Temp_Sum("time2");

avgtriplen = times/trips;

message(avgtriplen);

UMatrix_Temp_Free("");

return true;
```

Mode Choice: HBW

```
//HBW Mode Choice Model
zones = 700;
UMatrix_Zones(zones);

//declare input matrices

string in_matrix = new array
<< "autt2"              //0: am auto time
<< "trimppk"            //trimppk2(Bellevue version)  //1: am transit impedance
<< "primppk"            //primppk2(Bellevue version)  //2: am park and ride impedance
<< "dist2"              //3: auto distance
<< "prautt2b"           //4: park and ride auto travel time
<< "trfarepk"           //5: transit fare
<< "hbw99_pa"           //6: hbw person trip table
;

//decalre output matrices

string hbw_tr = "hbwtr";// hbw transit person
string hbw_pr = "hbwpr";// hbw park and ride person
string hbw_da = "hbwda";// hbw sov
string hbw_sh = "hbwsh";// hbw carpool

//declare constants

au_operating_cost = 15;//auto operating cost/mile
pr_au_c_p_m = 5.9;//p&r auto operating cost/minute


//check input matrices, make sure all files exist

for(i=0; i<in_matrix.size; i++){
if(UMatrix_Get("id", in_matrix[i], 0) <= 0){
error("Missing input matrix: "+ in_matrix[i]);
return false;
}}


//declare temporary working matrices

UMatrix_Constant("auopcost", au_operating_cost);
UMatrix_Constant("praucpm", pr_au_c_p_m);


UMatrix_Temp("autime",  in_matrix[0]); //copy auto time to temporary matrix
UMatrix_Temp("trimp",   in_matrix[1]); //copy transit impedance to temporary matrix
UMatrix_Temp("primp",   in_matrix[2]); //copy park & ride impedance to temporary matrix

UMatrix_Temp("audist",  in_matrix[3]); //copy auto distance to temporary matrix
UMatrix_Temp("prautime",in_matrix[4]); //copy p&r auto time to temporary matrix
UMatrix_Temp("trcost",  in_matrix[5]); //copy transit cost to temporary matrix
UMatrix_Temp("hbwpa",   in_matrix[6]); //copy transit cost to temporary matrix

UMatrix_Temp("hhcov",   "ZONP_"+"HHCOV"); //copy household transit coverage to temporary matrix
UMatrix_Temp("empcov",  "ZONP_"+"EMPCOV"); //copy employment transit coverage to temporary matrix
UMatrix_Temp("pkgcost", "ZONP_"+"LTCOST2"); //copy parking cost to temporary matrix
//UMatrix_Temp("autobias","ZONP_"+"HWAUBIAS"); //copy auto bias to temporary matrix

UMatrix_Temp("autobias","ZONP_"+"HWAUBIA2"); //copy auto bias to temporary matrix

//UMatrix_Temp("denbias", "ZONP_"+"HWDENBIAS"); //copy density bias to temporary matrix

UMatrix_Temp("denbias", "ZONP_"+"HWDENBIA2"); //modified Redmond Overlake


UMatrix_Temp("term",    "ZONP_"+"TERM"); //copy terminal time to temporary matrix

//
//UMatrix_Temp_Save("empcov", "temp");
//


if(!UMatrix_Run("trempcov" = tr("empcov"))) goto abort;


if(!UMatrix_Run("daterm" = "term"+tr("term"))) goto abort;// add terminal times at oridins and destinations
```



```
//calculate mode exponential for share ride bias
if(!UMatrix_Run("shbias" = if( (j<450), 0.68, 1.6)')) goto abort;
if(!UMatrix_Run("shbias" = if( (j<44 ), 0.80, "shbias")')) goto abort;
if(!UMatrix_Run("shbias" = if( (j>453)&&(j<485), 1.10, "shbias")')) goto abort;
if(!UMatrix_Run("shbias" = if( (j>541)&&(j<546), 2.70, "shbias")')) goto abort;

//calculate mode exponential for CBD dummy
if(!UMatrix_Run("cbddummy" = if( (j<480), 0.0, 0.3)')) goto abort;
if(!UMatrix_Run("cbddummy" = if( (j>484), 0.0, "cbddummy")')) goto abort;
if(!UMatrix_Run("cbddummy" = if( (j=471), 1.25, "cbddummy")')) goto abort;

//calculate mode exponential for park and ride bias
if(!UMatrix_Run("prbias" = if( ((j>465)&&(j<495), -7.70, -3.85)')) goto abort;
if(!UMatrix_Run("prbias" = if( (j>249)&&(j<261), -15.00, "prbias")')) goto abort;
if(!UMatrix_Run("prbias" = if( ((j>325)&&(j<371), -15.00, "prbias")')) goto abort;
if(!UMatrix_Run("prbias" = if( (j<44), -5.00, "prbias")')) goto abort;

//calculate share ride terminal time
if(!UMatrix_Run("shterm" = "daterm"+5' )) goto abort;

//calculate share ride auto time
if(!UMatrix_Run("shautime" = "autime"+5' )) goto abort;
if(!UMatrix_Run("shautime" = if( ("autime">9990),0,"shautime")')) goto abort;
if(!UMatrix_Run("shautime" = if( ("autime">360)&&("autime"<9990),360,"shautime")')) goto abort;

//calculate park and ride cost
if(!UMatrix_Run("prcost" = "prautime"*praucpm+"trcost")')) goto abort;
if(!UMatrix_Run("prcost" = if( ("prautime">9990),0,"prcost")')) goto abort;
if(!UMatrix_Run("prcost" = if( ("prautime">360)&&("prautime"<9990),360,"prcost")')) goto abort;

//calculate drive alone cost
if(!UMatrix_Run("dacost" = "audist"*auopcost+ tr("pkgcost")/2')) goto abort;
if(!UMatrix_Run("dacost" = if( ("audist">9990),0,"dacost")')) goto abort;

//calculate share ride cost
if(!UMatrix_Run("shcost" = "dacost"/2')) goto abort;

//calculate utilities by modes
if(!UMatrix_Run("trut1" = if( ("trimp">9990), 0, exp("trimp"* (-0.0311)+"trcost"*(0.4345)*(-0.0073)+"cbddummy"+ "denbias" ))')) goto abort;

if(!UMatrix_Run("prut1" = exp("primp"*-0.0311+"prautime"*0.0813+"prcost"*0.4345*-0.0073+'
    '"autobias"+"prbias"+"cbddummy"+ "denbias" )')) goto abort;

if(!UMatrix_Run("prut1" = if( ("primp">9990), 0,"prut1")')) goto abort;
if(!UMatrix_Run("prut1" = if( ("prautime">9990), 0,"prut1")')) goto abort;
if(!UMatrix_Run("prut1" = if( ("prautime">360)&&("prautime"<9990), 360,"prut1")')) goto abort;

if(!UMatrix_Run("daut1" = exp("daterm"*-0.1619+"dacost"*0.4345*-0.0073+'
   '"autobias"+"autime"*-0.0813')) goto abort;

if(!UMatrix_Run("daut1" = if( ("autime">9990), 0,"daut1")')) goto abort;
if(!UMatrix_Run("daut1" = if( ("autime">360)&&("autime"<9990), 360,"daut1")')) goto abort;

if(!UMatrix_Run("shut1" = exp("shterm"*-0.1619+"shcost"*0.4345*-0.0073+"shbias"+'
   "shautime"*-0.0813')) goto abort;

if(!UMatrix_Run("shut1" = if( ("shautime">9990), 0,"shut1")')) goto abort;

//calculation of the sum of the utilities for the four mode, three mode, and two mode choice domains
if(!UMatrix_Run("m4ut1" = "trut1"+"prut1"+"daut1"+"shut1")) goto abort;
if(!UMatrix_Run("m3ut1" = "m4ut1"-"trut1")) goto abort;
if(!UMatrix_Run("m2ut1" = "m3ut1"-"prut1")) goto abort;

//calculation of the hbw mode choice for transit, park&ride, and drive alone

if(!UMatrix_Run("trtrips" = "hbwpa"*("trut1"/"m4ut1")*("hhcov"/100)*("trempcov"/100) ')) goto abort;


if(!UMatrix_Run("prtrips" = "hbwpa"*("prut1"/"m4ut1")*("hhcov"/100)*("trempcov"/100)')) goto abort;
if(!UMatrix_Run("prtrips" = "prtrips" + "hbwpa"*("prut1"/"m3ut1")*(1-"hhcov"/100)*("trempcov"/100)')) goto abort;


if(!UMatrix_Run("datrips" = "hbwpa"*("daut1"/"m4ut1")*("hhcov"/100)*("trempcov"/100)' )) goto abort;
if(!UMatrix_Run("datrips" = "datrips" + "hbwpa"*("daut1"/"m3ut1")*(1-"hhcov"/100)*("trempcov"/100)' )) goto abort;
if(!UMatrix_Run("datrips" = "datrips" + "hbwpa"*("daut1"/"m2ut1")*(1- "trempcov"/100)' )) goto abort;


if(!UMatrix_Run("shtrips" = "hbwpa"-"trtrips"-"prtrips"-"datrips")) goto abort;
```

```
//copy final trip tables from temporary matrices to permanent

UMatrix_Temp_Save("trtrips", hbw_tr);
UMatrix_Temp_Save("prtrips", hbw_pr);
UMatrix_Temp_Save("datrips", hbw_da);
UMatrix_Temp_Save("shtrips", hbw_sh);


USet_GlobalNum(1, UMatrix_Temp_Sum("hbwpa"));
USet_GlobalNum(2, UMatrix_Temp_Sum("datrips"));
USet_GlobalNum(3, UMatrix_Temp_Sum("shtrips"));
USet_GlobalNum(4, UMatrix_Temp_Sum("trtrips"));
USet_GlobalNum(5, UMatrix_Temp_Sum("prtrips"));


abort:;
UMatrix_Temp_Free("");

return true;
```


Mode Choice: HBO

```
//HBO Mode Choice Model
zones = 700;
UMatrix_Zones(zones);
//declare input matrices

string in_matrix = new array
<< "autt0"              //0: off-peak auto time
<< "trimpop2"           //1: off-peak transit impedance
<< "dist0"              //2: auto distance
<< "trfareop"           //3: transit fare
<< "hbo99_pa"           //4: hbo person trip table
;

//decalre output matrices

string hbo_tr = "hbotr";// hbo transit person
string hbo_au = "hboau";// hbo auto person

//declare constants

au_operating_cost = 15;//auto operating cost/mile


//check input matrices, make sure all files exist

for(i=0; i<in_matrix.size; i++){
if(UMatrix_Get("id", in_matrix[i], 0) <= 0){
error("Missing input matrix: "+ in_matrix[i]);
return false;
}}


//declare temporary working matrices

UMatrix_Constant("auopcost", au_operating_cost);

UMatrix_Temp("autime", in_matrix[0]); //copy auto time to temporary matrix
UMatrix_Temp("trimp",  in_matrix[1]); //copy transit impedance to temporary matrix
UMatrix_Temp("audist", in_matrix[2]); //copy auto distance to temporary matrix
UMatrix_Temp("trcost", in_matrix[3]); //copy transit cost to temporary matrix
UMatrix_Temp("hbopa",  in_matrix[4]); //copy transit cost to temporary matrix

UMatrix_Temp("hhcov",   "ZONP_"+"HHCOV");     //copy household transit coverage to temporary matrix
UMatrix_Temp("empcov",  "ZONP_"+"EMPCOV");    //copy employment transit coverage to temporary matrix
UMatrix_Temp("pkgcost", "ZONP_"+"STCOST");    //copy parking cost to temporary matrix
UMatrix_Temp("autobias","ZONP_"+"HOAUBIAS");  //copy auto bias to temporary matrix
UMatrix_Temp("denbias", "ZONP_"+"HODENBIAS"); //copy density bias to temporary matrix
UMatrix_Temp("term",    "ZONP_"+"TERM");      //copy terminal time to temporary matrix


if(!UMatrix_Run("autoterm" = "term"+tr("term")')) return false:// add terminal times at oridins and destinations

//calculate mode exponential for CBD dummy
if(!UMatrix_Run("cbddummy" = if( (j>479)&&(j<485), 0.5, 0.0)')) goto abort;
if(!UMatrix_Run("cbddummy" = if( (j==471), 0.4, "cbddummy")')) goto abort;


//calculate auto cost

if(!UMatrix_Run("vehcost" = "audist"*auopcost+ tr("pkgcost")/2')) goto abort;
if(!UMatrix_Run("vehcost" = if( ("audist">9990),0,"vehcost")')) goto abort;


//calculate utilities by modes

if(!UMatrix_Run("trut1" = if( ("trimp">9990), 0,'
   'exp("trimp"*-0.0297+"trcost"*0.0156*-0.4345+"cbddummy"+"denbias")')')) goto abort;


if(!UMatrix_Run("auprut1" = exp("autoterm"*-0.1544+"autime"*-0.0775+'
   '"autobias"+"vehcost"*-0.0156*0.4345')')) goto abort;

if(!UMatrix_Run("auprut1" = if( ("autime">9990), 0,"auprut1")')) goto abort;
if(!UMatrix_Run("auprut1" = if( ("autime">360)&&("autime"<9990), 360,"auprut1")')) goto abort;
```

```
//calculation of the sum of the utilities for the four mode, three mode, and two mode choice domains


//calculation of the hbw mode choice for transit and auto

if(!UMatrix_Run("trtrips" = "hbopa"*("trut1"/("trut1"+"auprut1")*("hhcov"/100)*(tr("empcov")/100)) )) goto abort;

if(!UMatrix_Run("auprtrip" = "hbopa"-"trtrips")) goto abort;

//copy final trip tables from temporary matrices to permanent

UMatrix_Temp_Save("trtrips", hbo_tr);
UMatrix_Temp_Save("auprtrip", hbo_au);


USet_GlobalNum(6, UMatrix_Temp_Sum("hbopa"));
USet_GlobalNum(7, UMatrix_Temp_Sum("auprtrip"));
USet_GlobalNum(8, UMatrix_Temp_Sum("trtrips"));


abort:;
UMatrix_Temp_Free("");

return true;
```

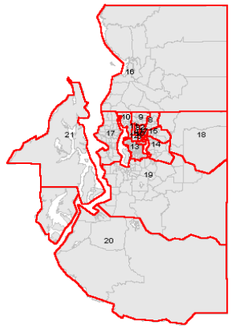

Mode Choice: NHB

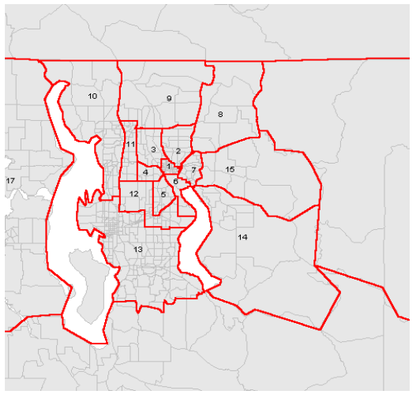
```
//NHB Mode Choice Model
zones = 700;
UMatrix_Zones(zones);

//declare input matrices

string in_matrix = new array
<< "autl0"              //0: off-peak auto time
<< "trimpop2"           //1: off-peak transit impedance
<< "dist0"              //2: auto distance
<< "trfareop"           //3: transit fare
<< "nhb99_pa"           //4: nhb person trip table
;

//decalre output matrices

string nhb_tr = "nhbtr";// nhb transit person
string nhb_au = "nhbau";// nhb auto person

//declare constants

au_operating_cost = 15;//auto operating cost/mile
autobias = 3.1;

//check input matrices, make sure all files exist

for(i=0; i<in_matrix.size; i++){
if(UMatrix_Get("id", in_matrix[i], 0) <= 0){
error("Missing input matrix: "+ in_matrix[i]);
return false;
}}


//declare temporary working matrices

UMatrix_Constant("auopcost", au_operating_cost);
UMatrix_Constant("autobias", autobias);


UMatrix_Temp("autime", in_matrix[0]); //copy auto time to temporary matrix
UMatrix_Temp("trimp",  in_matrix[1]); //copy transit impedance to temporary matrix
UMatrix_Temp("audist", in_matrix[2]); //copy auto distance to temporary matrix
UMatrix_Temp("trcost", in_matrix[3]); //copy transit cost to temporary matrix
UMatrix_Temp("nhbpa",  in_matrix[4]); //copy transit cost to temporary matrix

UMatrix_Temp("empcov", "ZONP_"+"EMPCOV");    //copy employment transit coverage to temporary matrix
UMatrix_Temp("pkgcost","ZONP_"+"STCOST");    //copy parking cost to temporary matrix
UMatrix_Temp("denbias","ZONP_"+"NHDENBIAS"); //copy density bias to temporary matrix
UMatrix_Temp("term",   "ZONP_"+"TERM");      //copy terminal time to temporary matrix


if(!UMatrix_Run("autoterm" = "term"+tr("term"))) return false;// add terminal times at oridins and destinations


//calculate mode exponential for CBD dummy
if(!UMatrix_Run("cbddummy" = if( (j>479)&&(j<485), 1.1, 0.0)')) goto abort;
if(!UMatrix_Run("cbddummy" = if( (j==471), 0.9, "cbddummy")')) goto abort;


//calculate auto cost

if(!UMatrix_Run("vehcost" = "audist"*auopcost+ tr("pkgcost")/2')) goto abort;
if(!UMatrix_Run("vehcost" = if( ("audist">9990),0,"vehcost")')) goto abort;


//calculate utilities by modes

if(!UMatrix_Run("trut1" = if( ("trimp">9990), 0,'
   'exp("trimp"*-0.0084+"trcost"*-0.0317*0.4345+"cbddummy"+"denbias")')') goto abort;


if(!UMatrix_Run("auprut1" = exp("autoterm"*-0.0436+"autime"*-0.0219+'
  'autobias+"vehcost"*-0.0091*0.4345')') goto abort;

if(!UMatrix_Run("auprut1" = if( ("autime">9990), 0,"auprut1")')) goto abort;
```

```
if(!UMatrix_Run(""auprut1" = if( ("autime">360)&&("autime"<9990), 360,"auprut1")')) goto abort;

//calculation of the sum of the utilities for the four mode, three mode, and two mode choice domains


//calculation of the hbw mode choice for transit and auto


if(!UMatrix_Run(""trtrips" = "nhbpa"*("trut1"/("trut1"+"auprut1")*(tr("empcov")/100)) ')) goto abort;

if(!UMatrix_Run(""auprtrip" = "nhbpa"-"trtrips"')) goto abort;

//copy final trip tables from temporary matrices to permanent

UMatrix_Temp_Save("trtrips", nhb_tr);
UMatrix_Temp_Save("auprtrip", nhb_au);


USet_GlobalNum(9,  UMatrix_Temp_Sum("nhbpa"));
USet_GlobalNum(10, UMatrix_Temp_Sum("auprtrip"));
USet_GlobalNum(11, UMatrix_Temp_Sum("trtrips"));


abort:;

UMatrix_Temp_Free("");

return true;
```


Redmond / PSRC Mode Share Compare:

PSRC 2020 Mode Shares:





ID	Name	Remark
1	REDCBD	Redmond Downtown
2	REDNE	NE Redmond
3	REDWIL	Redmond Willows
4	REDGL	Redmond Grass Lawn
5	REDOLK	Redmond Overlake
6	REDVPT	Redmond Viewpoint
7	REDSE	SE Redmond
8	BEARCK	King County Bear Creek
9	WOODV	City of Woodinville
10	KIRKLBO	City of Kirkland/Bothell
11	KIRKEAST	Kirkland East
12	BELOLK	Bellevue Overlake
13	BELLEVUE	City of Bellevue
14	SAMM	City of Sammakish
15	REDRGE	Redmond Ridge
16	SNOCO	Snohomish County
17	SEATTLE	City of Seattle/Mercer Island
18	EKINGCO	East King County
19	SKINGCO	South King County
20	PIERCE	Pierce County
21	KITSAP	Kitsap County

Table 22
2020 Daily Total Persons - Transit%
2020 PSRC MTP - No Action

PRODUCTION \ ATTRACTION		1 REDCBD	2 REDNE	3 REDWIL	4 REDGL	5 REDOLK	6 REDVPT	7 REDSE	8 BEARCK	9 WOODKV	10 KIRKLBO	11 KIRKEAST	12 BELOLK	13 BELLEVUE	14 SAMM	15 REDRGE	16 SNOCO	17 SEATTLE	18 EKINGCO	19 SKINGCO	20 PIERCE	21 KITSAP	Prod Totals
REDCBD	1	0.0%	0.1%	0.1%	0.2%	0.3%	0.1%	0.1%	0.0%	0.1%	0.2%	0.2%	0.2%	1.1%	0.0%	0.0%	0.0%	7.3%	0.0%	0.6%	0.1%	0.2%	0.5%
REDNE	2	0.9%	0.2%	0.6%	0.6%	0.8%	0.4%	0.2%	0.0%	0.2%	0.6%	0.5%	0.6%	6.5%	0.2%	0.0%	0.3%	34.2%	0.0%	3.6%	0.1%	0.1%	3.9%
REDWIL	3	0.2%	0.1%	0.1%	0.2%	0.4%	0.1%	0.1%	0.0%	0.0%	0.2%	0.1%	0.3%	3.1%	0.0%	0.0%	0.0%	15.9%	0.0%	2.0%	0.1%	0.2%	1.3%
REDGL	4	1.1%	0.4%	0.5%	0.0%	0.8%	0.2%	0.2%	0.1%	0.2%	0.4%	0.5%	0.4%	4.9%	0.1%	0.0%	0.2%	30.6%	0.0%	4.4%	0.1%	0.0%	5.0%
REDOLK	5	0.6%	0.2%	0.2%	0.1%	0.1%	0.2%	0.1%	0.0%	0.1%	0.4%	0.4%	0.2%	2.3%	0.1%	0.0%	0.1%	14.1%	0.0%	2.1%	0.1%	0.3%	1.5%
REDVPT	6	0.7%	0.3%	0.4%	0.3%	0.4%	0.0%	0.1%	0.0%	0.2%	0.4%	0.5%	0.2%	4.2%	0.1%	0.0%	0.2%	26.1%	0.0%	3.4%	0.0%	0.0%	4.0%
REDSE	7	0.2%	0.1%	0.1%	0.2%	0.3%	0.1%	0.0%	0.0%	0.0%	0.1%	0.2%	0.2%	2.4%	0.0%	0.0%	0.0%	17.0%	0.0%	1.0%	0.0%	0.1%	1.1%
BEARCK	8	0.2%	0.1%	0.1%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%	0.2%	0.2%	0.1%	3.5%	0.0%	0.0%	0.1%	22.1%	0.0%	0.6%	0.0%	0.0%	1.6%
WOODV	9	0.5%	0.2%	0.2%	0.2%	0.4%	0.1%	0.1%	0.0%	0.1%	0.3%	0.3%	0.3%	7.7%	0.1%	0.0%	0.1%	22.0%	0.0%	4.1%	0.1%	0.1%	2.1%
KIRKLBO	10	0.7%	0.2%	0.3%	0.3%	0.6%	0.2%	0.1%	0.0%	0.2%	0.2%	0.6%	0.4%	5.2%	0.1%	0.0%	0.2%	13.5%	0.0%	4.8%	0.1%	0.2%	3.3%
KIRKEAST	11	0.5%	0.1%	0.2%	0.3%	0.6%	0.2%	0.1%	0.0%	0.1%	0.3%	0.1%	0.3%	4.2%	0.1%	0.0%	0.1%	19.0%	0.0%	4.0%	0.1%	0.2%	2.3%
BELOLK	12	0.8%	0.3%	0.5%	0.3%	0.4%	0.2%	0.2%	0.0%	0.2%	0.4%	0.5%	0.2%	3.6%	0.1%	0.0%	0.1%	20.8%	0.0%	4.3%	0.1%	0.1%	3.5%
BELLEVUE	13	0.5%	0.2%	0.3%	0.2%	0.6%	0.2%	0.1%	0.0%	0.2%	0.5%	0.6%	0.3%	1.4%	0.1%	0.0%	0.1%	13.2%	0.0%	1.5%	0.2%	0.2%	2.7%
SAMM	14	0.2%	0.1%	0.1%	0.1%	0.2%	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	1.6%	0.0%	0.0%	0.0%	14.2%	0.0%	0.1%	0.0%	0.0%	1.7%
REDRGE	15	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	1.8%	0.0%	0.0%	0.0%	11.9%	0.0%	0.2%	0.0%	0.0%	1.2%
SNOCO	16	0.3%	0.1%	0.2%	0.2%	0.3%	0.1%	0.1%	0.0%	0.0%	0.1%	0.3%	0.2%	3.1%	0.1%	0.0%	0.5%	8.1%	0.0%	1.4%	0.2%	0.3%	1.4%
SEATTLE	17	1.8%	0.2%	1.2%	0.7%	2.2%	0.4%	0.4%	0.0%	0.2%	0.9%	1.4%	1.1%	6.4%	0.2%	0.0%	0.4%	16.1%	0.0%	3.8%	1.5%	1.6%	14.4%
EKINGCO	18	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.4%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.3%
SKINGCO	19	0.3%	0.1%	0.3%	0.2%	0.4%	0.1%	0.1%	0.0%	0.3%	0.4%	0.5%	0.3%	2.3%	0.1%	0.0%	0.3%	15.2%	0.0%	0.5%	0.3%	0.7%	2.0%
PIERCE	20	0.3%	0.1%	0.2%	0.2%	0.3%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.1%	0.7%	0.1%	0.1%	0.3%	7.4%	0.1%	0.9%	1.1%	0.3%	1.3%
KITSAP	21	4.6%	2.6%	5.8%	3.5%	9.1%	2.0%	3.2%	0.1%	2.2%	5.7%	5.8%	3.6%	9.0%	1.4%	0.0%	2.8%	40.7%	0.0%	8.8%	1.0%	1.1%	3.7%
Attraction Totals		0.5%	0.1%	0.3%	0.3%	0.6%	0.2%	0.1%	0.0%	0.1%	0.3%	0.4%	0.4%	2.8%	0.1%	0.0%	0.5%	15.3%	0.0%	0.8%	1.0%	1.1%	**4.3%**
Redmond Production				*2.2%*																			
Redmond Attraction				*0.4%*																			

Table 22
2020 Daily Total Persons - Carpool%
2020 PSRC MTP - No Action

PRODUCTION \ ATTRACTION		1 REDCBD	2 REDNE	3 REDWIL	4 REDGL	5 REDOLK	6 REDVPT	7 REDSE	8 BEARCK	9 WOODKV	10 KIRKLBO	11 KIRKEAST	12 BELOLK	13 BELLEVUE	14 SAMM	15 REDRGE	16 SNOCO	17 SEATTLE	18 EKINGCO	19 SKINGCO	20 PIERCE	21 KITSAP	Prod Totals
REDCBD	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.4%	0.0%	0.0%	0.0%	0.7%	0.0%	0.1%	0.0%	0.0%	0.1%
REDNE	2	0.3%	0.1%	0.4%	0.4%	0.4%	0.6%	0.3%	0.1%	0.5%	0.9%	0.8%	0.8%	4.9%	0.5%	0.3%	1.9%	7.1%	2.2%	2.8%	0.0%	0.0%	1.7%
REDWIL	3	0.1%	0.1%	0.0%	0.1%	0.2%	0.2%	0.1%	0.0%	0.1%	0.2%	0.2%	0.4%	2.8%	0.1%	0.1%	0.2%	4.0%	0.3%	1.3%	0.0%	0.0%	0.6%
REDGL	4	0.5%	0.5%	0.4%	0.0%	0.3%	0.5%	0.4%	0.2%	0.9%	0.7%	0.9%	0.6%	4.5%	0.8%	0.5%	2.0%	7.3%	3.0%	3.4%	0.0%	0.0%	2.4%
REDOLK	5	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%	0.3%	0.3%	0.1%	0.9%	0.1%	0.1%	0.2%	2.1%	0.3%	0.7%	0.0%	0.0%	0.4%
REDVPT	6	1.1%	1.0%	1.0%	0.8%	0.4%	0.0%	0.9%	0.4%	1.7%	2.2%	2.7%	0.8%	5.6%	1.2%	0.9%	3.1%	11.7%	5.5%	4.6%	0.0%	0.0%	3.3%
REDSE	7	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.0%	0.0%	0.1%	0.3%	0.4%	0.3%	2.2%	0.1%	0.0%	0.2%	3.6%	0.2%	0.9%	0.0%	0.0%	0.5%
BEARCK	8	0.3%	0.1%	0.3%	0.3%	0.3%	0.6%	0.2%	0.0%	0.2%	0.7%	0.6%	0.7%	5.1%	0.4%	0.2%	1.0%	7.7%	0.6%	1.3%	0.0%	0.0%	1.3%
WOODV	9	0.8%	0.4%	0.5%	0.8%	0.8%	1.3%	0.5%	0.1%	0.2%	0.5%	0.7%	1.8%	7.1%	0.9%	0.5%	0.8%	7.6%	1.1%	2.6%	0.0%	0.0%	1.5%
KIRKLBO	10	1.2%	0.8%	0.6%	0.7%	1.1%	1.6%	0.9%	0.3%	0.5%	0.3%	0.8%	1.3%	5.2%	1.1%	0.7%	1.1%	5.2%	2.2%	3.0%	0.0%	0.0%	2.1%
KIRKEAST	11	0.6%	0.3%	0.3%	0.5%	0.7%	1.0%	0.4%	0.1%	0.2%	0.4%	0.2%	1.2%	5.0%	0.7%	0.3%	0.5%	7.9%	0.7%	3.6%	0.0%	0.0%	1.7%
BELOLK	12	0.9%	0.7%	0.8%	0.6%	0.4%	0.5%	0.6%	0.2%	1.0%	1.1%	1.6%	0.4%	3.1%	0.7%	0.5%	0.8%	8.3%	1.7%	3.0%	0.0%	0.0%	2.3%
BELLEVUE	13	0.7%	0.4%	0.6%	0.4%	0.4%	0.5%	0.4%	0.0%	0.4%	0.6%	1.0%	0.5%	1.4%	0.3%	0.1%	0.0%	4.5%	0.8%	1.5%	0.0%	0.0%	1.6%
SAMM	14	0.3%	0.2%	0.3%	0.3%	0.3%	0.5%	0.1%	0.1%	0.5%	0.8%	1.1%	0.6%	2.7%	0.0%	0.1%	0.3%	5.7%	0.4%	0.5%	0.0%	0.0%	1.2%
REDRGE	15	0.3%	0.2%	0.4%	0.5%	0.4%	0.7%	0.2%	0.1%	0.7%	1.2%	1.4%	0.9%	6.7%	0.2%	0.0%	0.6%	8.9%	0.9%	1.5%	0.0%	0.0%	1.8%
SNOCO	16	2.3%	1.2%	1.5%	1.8%	1.6%	2.1%	1.5%	0.4%	0.7%	1.2%	2.4%	3.0%	8.1%	0.8%	0.7%	0.5%	5.9%	2.2%	3.1%	0.2%	0.1%	1.4%
SEATTLE	17	1.7%	0.1%	1.9%	0.7%	1.6%	1.1%	1.3%	0.0%	0.8%	1.1%	2.8%	2.0%	4.4%	0.5%	0.0%	0.6%	1.3%	0.1%	1.4%	0.0%	0.0%	1.4%
EKINGCO	18	2.8%	1.6%	3.4%	3.8%	3.0%	5.4%	1.6%	0.4%	1.9%	6.5%	7.3%	6.3%	18.4%	1.3%	0.8%	2.7%	19.2%	0.4%	2.7%	0.0%	0.0%	4.8%
SKINGCO	19	2.6%	1.3%	2.2%	1.6%	1.7%	1.9%	1.7%	0.3%	0.6%	2.2%	5.4%	2.6%	5.0%	0.6%	0.7%	0.2%	5.2%	1.7%	0.9%	0.7%	0.0%	1.4%
PIERCE	20	2.0%	1.7%	3.3%	2.3%	3.4%	2.0%	3.3%	0.1%	2.7%	3.0%	5.0%	2.6%	5.4%	1.3%	0.6%	1.8%	8.5%	3.1%	3.4%	0.7%	1.9%	1.4%
KITSAP	21	8.4%	6.6%	14.5%	8.9%	13.6%	9.4%	16.6%	0.0%	12.4%	12.3%	17.7%	11.2%	13.4%	12.3%	2.2%	4.7%	9.0%	15.6%	15.2%	2.9%	0.6%	1.9%
Attraction Totals		0.8%	0.5%	0.8%	0.7%	1.0%	0.9%	0.6%	0.2%	0.5%	0.9%	1.4%	1.2%	3.6%	0.4%	0.3%	0.6%	2.8%	1.0%	1.3%	0.7%	0.6%	**1.5%**
Redmond Production				*1.0%*																			
Redmond Attraction				*0.9%*																			

Table 23
2020 Daily Total Persons - Non-carpool%
2020 PSRC MTP - No Action

PRODUCTION	ATTRACTION	REDCBD 1	REDNE 2	REDWIL 3	REDGL 4	REDOLK 5	REDVPT 6	REDSE 7	BEARCK 8	WOODKV 9	KIRKLBO 10	KIRKEAST 11	BELOLK 12	BELLEVUE 13	SAMM 14	REDRGE 15	SNOCO 16	SEATTLE 17	EKINGCO 18	SKINGCO 19	PIERCE 20	KITSAP 21	**Prod Totals**
REDCBD	1	95.5%	85.4%	91.1%	81.0%	89.6%	80.3%	90.1%	86.4%	80.8%	83.4%	90.0%	87.7%	82.4%	82.7%	82.8%	63.2%	54.2%	68.7%	64.6%	77.5%	83.1%	86.2%
REDNE	2	97.0%	95.3%	95.8%	93.5%	96.7%	93.0%	95.0%	91.9%	89.3%	92.5%	95.9%	95.7%	85.4%	87.8%	87.8%	68.3%	53.2%	66.9%	86.4%	62.4%	45.4%	90.1%
REDWIL	3	91.8%	75.6%	89.5%	78.1%	87.0%	74.8%	82.6%	75.3%	77.5%	83.2%	90.5%	85.4%	77.6%	71.1%	69.4%	56.5%	50.1%	52.1%	64.3%	69.8%	73.0%	82.0%
REDGL	4	94.4%	85.9%	93.7%	95.0%	96.2%	91.5%	89.3%	80.4%	77.5%	92.6%	94.3%	95.9%	87.2%	79.0%	74.7%	50.0%	55.4%	45.4%	82.4%	57.4%	33.3%	87.6%
REDOLK	5	89.8%	72.4%	85.2%	78.5%	91.9%	80.0%	80.7%	72.6%	67.8%	78.6%	85.9%	88.5%	80.8%	70.7%	65.2%	58.6%	53.0%	47.4%	63.2%	73.2%	76.4%	83.7%
REDVPT	6	93.8%	84.8%	92.1%	90.9%	97.1%	96.3%	88.8%	78.7%	75.4%	89.1%	90.7%	96.7%	86.6%	81.7%	74.4%	53.6%	56.3%	48.1%	83.5%	63.8%	50.0%	88.6%
REDSE	7	92.8%	81.0%	86.2%	75.4%	88.4%	75.1%	89.9%	81.7%	70.1%	75.8%	84.6%	85.7%	78.4%	77.8%	79.0%	53.3%	48.1%	60.0%	66.2%	69.5%	72.4%	82.4%
BEARCK	8	97.9%	96.0%	96.8%	95.3%	97.6%	94.1%	96.1%	96.0%	94.8%	93.9%	97.1%	96.6%	88.6%	89.9%	89.9%	80.5%	65.4%	83.9%	91.7%	75.9%	68.4%	92.7%
WOODV	9	94.8%	91.0%	94.2%	89.5%	94.3%	87.2%	91.8%	89.4%	92.4%	91.7%	95.5%	92.4%	79.6%	81.2%	80.2%	76.2%	59.9%	72.5%	83.7%	70.6%	69.5%	87.8%
KIRKLBO	10	90.2%	81.4%	91.6%	84.2%	89.7%	79.0%	82.3%	76.4%	89.1%	94.2%	94.2%	90.6%	82.0%	71.0%	66.9%	81.3%	72.0%	52.9%	76.6%	73.7%	73.7%	86.4%
KIRKEAST	11	92.1%	81.8%	91.8%	85.9%	90.6%	80.2%	84.4%	79.8%	86.0%	90.6%	95.2%	90.7%	82.8%	74.3%	71.1%	68.0%	56.4%	58.1%	71.1%	76.0%	78.2%	85.9%
BELOLK	12	89.9%	76.2%	86.6%	84.0%	94.4%	87.8%	82.9%	72.9%	68.9%	85.8%	88.8%	94.7%	86.9%	77.8%	66.1%	54.7%	57.5%	42.7%	74.6%	68.6%	69.1%	86.2%
BELLEVUE	13	82.7%	60.5%	75.1%	67.9%	86.5%	71.9%	71.4%	58.6%	58.3%	79.3%	82.1%	88.5%	88.5%	80.3%	50.0%	55.7%	63.6%	43.4%	74.7%	69.6%	71.7%	83.2%
SAMM	14	96.7%	90.8%	94.2%	90.8%	95.8%	89.2%	94.4%	85.3%	77.7%	88.1%	92.7%	94.2%	89.6%	95.2%	82.4%	73.4%	71.1%	87.4%	89.7%	76.2%	74.6%	90.5%
REDRGE	15	98.0%	95.5%	96.4%	95.0%	97.6%	94.2%	97.1%	93.9%	88.0%	93.1%	95.3%	96.5%	88.9%	95.1%	93.4%	83.0%	76.4%	84.4%	93.3%	86.5%	79.2%	92.9%
SNOCO	16	93.4%	89.2%	93.0%	90.3%	96.4%	92.2%	92.2%	85.6%	91.3%	92.3%	93.6%	93.5%	86.3%	93.6%	84.1%	89.9%	82.1%	80.7%	90.6%	86.3%	83.8%	89.1%
SEATTLE	17	65.3%	30.9%	61.8%	47.0%	74.2%	51.1%	55.0%	25.8%	55.6%	74.3%	71.2%	77.5%	73.3%	59.8%	33.9%	79.5%	71.7%	55.4%	72.8%	71.6%	72.8%	71.9%
EKINGCO	18	95.3%	94.4%	93.4%	91.1%	94.9%	88.7%	95.4%	94.9%	92.4%	88.0%	90.2%	91.0%	78.3%	92.6%	91.6%	84.3%	75.9%	93.7%	91.4%	87.5%	82.7%	89.8%
SKINGCO	19	87.1%	75.5%	84.6%	76.0%	91.3%	79.2%	83.9%	75.1%	80.4%	84.3%	84.2%	88.7%	85.6%	89.2%	70.1%	82.8%	68.9%	84.8%	89.3%	77.7%	79.7%	86.7%
PIERCE	20	96.2%	93.8%	94.4%	94.7%	95.7%	95.7%	93.6%	90.8%	90.7%	94.4%	93.3%	96.3%	93.1%	94.5%	85.3%	86.2%	82.8%	83.7%	87.8%	89.4%	80.2%	89.0%
KITSAP	21	85.2%	85.7%	77.7%	85.5%	76.7%	86.6%	77.6%	90.1%	78.8%	79.7%	75.1%	84.4%	77.0%	82.6%	82.5%	84.0%	49.5%	72.0%	72.6%	81.2%	89.9%	86.6%
Attraction Totals		93.0%	85.9%	90.3%	82.7%	91.8%	83.6%	89.1%	87.5%	89.2%	89.9%	92.2%	90.4%	85.4%	90.4%	84.2%	88.9%	72.0%	87.2%	88.0%	88.8%	89.6%	**84.7%**
Redmond Production				*84.9%*																			
Redmond Attraction				*90.6%*																			

RST International Inc.

Redmond 2020 Mode Shares Without CTR Adjustments:

Table 15
2020 Daily Total Persons - Transit
2020 Redmond/BKR - Baseline

PRODUCTION \ ATTRACTION		REDCBD	REDNE	REDWIL	REDGL	REDOLK	REDVPT	REDSE	BEARCK	WOODKV	KIRKLBO	KIRKEAST	BELOLK	BELLEVUE	SAMM	REDRGE	SNOCO	SEATTLE	EKINGCO	SKINGCO	PIERCE	KITSAP	Prod Totals	Prod Shares
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
REDCBD	1	285	8	71	4	740	1	47	1	6	56	35	24	146	2	3	8	205	–	17	2	–	1,661	0.2%
REDNE	2	202	3	43	2	450	–	21	2	7	22	13	8	92	2	–	4	237	–	7	–	–	1,115	0.1%
REDWIL	3	75	2	22	1	147	–	7	–	5	38	31	7	65	–	1	6	125	–	10	1	–	543	0.1%
REDGL	4	90	3	41	3	428	4	27	–	1	41	23	32	146	1	1	–	122	–	4	–	–	967	0.1%
REDOLK	5	189	5	45	5	1,248	2	29	1	6	78	38	97	349	3	3	12	410	–	45	4	–	2,569	0.3%
REDVPT	6	62	2	23	2	508	6	21	–	1	25	8	52	162	1	1	–	91	–	4	–	–	969	0.1%
REDSE	7	181	4	38	2	392	–	47	–	2	21	11	11	71	1	3	3	90	–	9	1	–	887	0.1%
BEARCK	8	15	–	4	–	36	–	2	3	2	6	4	1	14	–	–	5	47	–	4	1	–	144	0.0%
WOODV	9	65	2	28	1	205	–	5	5	42	112	77	10	215	3	1	64	585	–	30	4	–	1,454	0.2%
KIRKLBO	10	111	3	59	4	458	–	8	4	46	435	213	31	679	4	1	106	3,412	–	84	11	–	5,669	0.7%
KIRKEAST	11	65	2	31	2	198	–	5	–	16	144	97	12	187	2	1	18	369	–	25	2	–	1,176	0.1%
BELOLK	12	152	5	68	9	1,518	16	45	–	4	139	46	191	858	4	2	6	446	–	30	2	–	3,541	0.4%
BELLEVUE	13	172	8	73	9	2,169	14	51	1	13	718	143	450	8,026	34	3	35	3,416	–	289	13	–	15,637	1.8%
SAMM	14	83	1	15	–	204	–	16	1	3	22	8	11	169	73	2	14	693	–	71	10	–	1,396	0.2%
REDRGE	15	61	1	8	–	97	–	14	–	2	10	5	5	36	2	2	5	110	–	10	2	–	370	0.0%
SNOCO	16	260	11	195	9	1,038	2	24	17	109	761	282	128	2,664	15	3	13,978	34,942	1	1,754	680	14	56,887	6.6%
SEATTLE	17	127	6	40	5	548	3	15	3	22	395	106	97	1,911	15	2	614	237,476	–	1,545	135	9	243,074	28.4%
EKINGCO	18	34	–	7	–	89	–	4	3	3	13	5	4	55	3	–	17	257	1	24	18	–	537	0.1%
SKINGCO	19	141	7	46	5	652	3	20	3	23	318	104	107	2,436	53	2	348	37,884	1	9,835	496	7	52,491	6.1%
PIERCE	20	1,090	141	310	63	3,688	58	358	19	454	2,519	878	1,349	8,735	520	106	3,632	40,011	15	38,567	264,097	2,526	369,136	43.1%
KITSAP	21	589	80	169	34	1,637	33	194	13	261	1,297	420	603	3,334	244	58	3,260	23,987	–	5,402	7,983	46,206	95,804	11.2%
Attraction Totals		4,049	294	1,336	160	16,450	142	960	76	1,028	7,170	2,547	3,230	30,350	982	195	22,135	384,915	18	57,766	273,462	48,782	856,027	100.0%
Attraction Shares		0.5%	0.0%	0.2%	0.0%	1.9%	0.0%	0.1%	0.0%	0.1%	0.8%	0.3%	0.4%	3.5%	0.1%	0.0%	2.6%	45.0%	0.0%	6.7%	31.9%	5.7%	100.0%	
Redmond Production			*8,711*	*1.0%*																				
Redmond Attraction			*23,391*	*2.7%*																				

Table 16
2020 Daily Total Persons - Carpool
2020 Redmond/BKR - Baseline

PRODUCTION \ ATTRACTION		REDCBD	REDNE	REDWIL	REDGL	REDOLK	REDVPT	REDSE	BEARCK	WOODKV	KIRKLBO	KIRKEAST	BELOLK	BELLEVUE	SAMM	REDRGE	SNOCO	SEATTLE	EKINGCO	SKINGCO	PIERCE	KITSAP	Prod Totals	Prod Shares
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
REDCBD	1	91	9	104	2	285	14	138	–	2	18	10	23	87	9	5	2	13	–	5	–	–	817	0.2%
REDNE	2	331	33	331	4	651	28	357	3	14	45	28	40	172	25	19	15	47	2	13	–	–	2,158	0.4%
REDWIL	3	151	11	175	4	475	16	125	1	6	54	35	30	141	9	5	8	37	–	8	–	–	1,291	0.2%
REDGL	4	83	4	90	2	392	10	62	–	1	26	13	25	104	5	2	2	23	–	5	–	–	849	0.2%
REDOLK	5	52	3	46	1	461	13	44	–	1	18	5	47	185	5	2	1	27	–	9	–	–	920	0.2%
REDVPT	6	27	1	23	–	284	8	21	–	–	6	2	25	73	3	1	1	20	–	6	–	–	501	0.1%
REDSE	7	54	5	44	1	150	9	97	–	1	7	3	10	41	12	7	1	10	1	5	–	–	458	0.1%
BEARCK	8	152	22	176	2	362	13	185	26	73	44	23	23	116	33	26	213	81	14	18	–	–	1,602	0.3%
WOODV	9	407	50	703	6	990	32	366	17	374	357	202	66	504	38	28	708	337	7	40	–	–	5,232	1.0%
KIRKLBO	10	308	28	610	10	1,252	32	239	6	182	1,169	327	108	1,278	33	16	1,676	1,881	3	82	–	–	9,240	1.7%
KIRKEAST	11	138	10	239	5	535	14	93	1	25	161	87	37	280	9	5	33	74	1	15	–	–	1,762	0.3%
BELOLK	12	93	5	90	3	1,413	27	72	–	2	50	13	136	648	16	4	3	144	–	34	–	–	2,753	0.5%
BELLEVUE	13	130	8	125	4	2,211	40	114	1	4	221	35	345	4,570	295	9	10	2,599	5	986	–	–	11,712	2.2%
SAMM	14	561	44	313	6	1,421	81	963	4	10	78	33	99	815	1,636	134	18	1,011	44	647	–	–	7,918	1.5%
REDRGE	15	254	23	137	2	547	28	464	4	7	31	14	34	175	128	102	12	86	24	57	–	–	2,129	0.4%
SNOCO	16	450	63	710	10	1,504	50	586	106	1,071	1,420	314	140	1,233	196	108	93,407	20,078	165	334	–	16	121,961	22.6%
SEATTLE	17	9	1	18	–	117	3	13	1	11	78	9	21	336	39	2	1,783	69,454	1	3,663	6	14	75,579	14.0%
EKINGCO	18	157	16	126	2	382	16	219	25	60	37	17	26	197	261	77	277	290	340	263	–	–	2,788	0.5%
SKINGCO	19	83	8	76	2	984	21	141	1	4	95	21	140	2,091	830	28	13	27,233	67	81,485	1,201	8	114,532	21.2%
PIERCE	20	–	–	–	–	–	–	–	–	–	–	–	–	8	12	–	–	4,227	–	31,333	100,937	836	137,353	25.4%
KITSAP	21	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1,015	6,938	–	1,949	1,737	27,634	39,273	7.3%
Attraction Totals		3,531	344	4,136	66	14,416	455	4,299	196	1,848	3,915	1,191	1,375	13,054	3,594	580	99,198	134,610	674	120,957	103,881	28,508	540,828	100.0%
Attraction Shares		0.7%	0.1%	0.8%	0.0%	2.7%	0.1%	0.8%	0.0%	0.3%	0.7%	0.2%	0.3%	2.4%	0.7%	0.1%	18.3%	24.9%	0.1%	22.4%	19.2%	5.3%	100.0%	
Redmond Production			*6,994*	*1.3%*																				
Redmond Attraction			*27,247*	*5.0%*																				

Table 17
2020 Daily Total Persons - Non-carpool
2020 Redmond/BKR - Baseline

PRODUCTION		ATTRACTION	1 REDCBD	2 REDNE	3 REDWIL	4 REDGL	5 REDOLK	6 REDVPT	7 REDSE	8 BEARCK	9 WOODKV	10 KIRKLBO	11 KIRKEAST	12 BELOLK	13 BELLEVUE	14 SAMM	15 REDRGE	16 SNOCO	17 SEATTLE	18 EKINGCO	19 SKINGCO	20 PIERCE	21 KITSAP	Prod Totals	Prod Shares
REDCBD	1		17,148	1,473	4,117	410	12,118	330	7,944	203	1,906	3,931	3,093	3,399	6,990	1,066	1,338	1,715	2,381	87	1,361	229	71	71,310	0.5%
REDNE	2		12,052	2,609	3,403	288	10,265	505	5,481	263	2,898	3,430	2,687	2,585	7,051	456	924	1,160	1,845	33	661	59	22	58,677	0.4%
REDWIL	3		6,134	589	3,706	318	6,464	201	1,734	104	2,018	4,928	4,318	1,669	5,149	297	315	1,439	1,497	32	762	128	40	41,842	0.3%
REDGL	4		3,180	199	1,239	326	7,696	193	876	12	317	1,983	1,657	1,925	4,847	98	115	233	852	4	288	16	4	26,020	0.2%
REDOLK	5		9,491	671	2,893	536	47,911	615	4,439	154	1,384	5,895	3,130	16,774	28,473	1,164	1,000	2,296	7,575	104	3,940	469	136	139,050	0.9%
REDVPT	6		1,485	98	345	63	6,711	346	450	7	112	551	282	2,597	3,926	92	72	106	747	3	274	16	5	18,288	0.1%
REDSE	7		9,534	966	1,358	150	6,972	251	7,929	164	853	1,691	1,121	1,968	4,505	1,160	2,045	1,015	1,631	77	917	170	54	44,531	0.3%
BEARCK	8		2,532	766	1,144	70	3,335	183	1,717	2,145	4,269	1,863	1,156	918	3,078	374	809	5,479	1,667	217	686	113	68	32,589	0.2%
WOODV	9		11,654	2,831	8,945	558	14,361	633	4,686	1,483	54,370	32,393	19,543	4,525	26,711	953	1,097	32,258	10,762	231	3,905	581	233	232,713	1.5%
KIRKLBO	10		11,041	1,401	8,940	985	22,816	604	3,710	383	21,554	111,292	37,463	9,088	68,215	1,390	882	44,797	49,447	159	8,525	1,026	388	404,106	2.7%
KIRKEAST	11		5,926	647	4,835	587	9,875	266	1,810	171	6,089	23,402	15,970	3,110	18,589	489	384	4,910	5,063	54	2,374	268	81	104,900	0.7%
BELOLK	12		5,005	381	1,509	362	38,482	843	2,305	69	752	4,946	2,185	19,816	39,606	792	486	1,290	6,758	49	3,063	284	80	129,132	0.9%
BELLEVUE	13		7,777	704	2,719	497	52,240	828	3,969	183	3,301	24,056	8,444	34,896	386,371	9,656	1,094	6,767	60,568	226	44,597	2,002	472	653,457	4.3%
SAMM	14		9,196	947	1,853	250	13,343	950	8,065	199	1,247	3,319	1,659	4,231	23,944	69,323	5,448	2,645	11,770	921	20,689	994	515	181,508	1.2%
REDRGE	15		7,379	997	1,242	168	8,171	443	7,597	287	956	1,894	1,085	2,251	6,798	3,403	8,792	1,421	3,135	1,304	2,024	288	164	59,799	0.4%
SNOCO	16		13,792	2,384	8,263	1,011	29,776	948	6,739	2,864	61,417	91,463	23,004	12,447	74,359	5,826	3,665	2,228,378	349,848	2,948	45,758	11,275	8,584	2,974,749	19.6%
SEATTLE	17		3,917	480	1,691	259	16,670	244	2,044	239	4,754	27,390	5,298	8,319	76,058	3,831	954	127,610	2,364,920	411	123,298	8,928	3,064	2,780,379	18.4%
EKINGCO	18		2,180	384	774	80	3,965	236	1,706	746	2,420	1,774	806	1,292	5,767	3,506	3,918	6,236	5,222	17,304	6,031	823	184	65,354	0.4%
SKINGCO	19		4,364	559	1,641	287	18,815	458	2,501	258	3,439	11,344	4,207	10,168	111,510	21,880	1,656	18,375	294,366	1,755	2,622,378	90,435	9,641	3,230,037	21.3%
PIERCE	20		2,392	481	1,012	164	7,504	196	1,484	279	4,034	6,007	1,883	4,262	22,679	4,502	1,374	20,289	68,476	753	284,576	2,345,470	67,745	2,845,562	18.8%
KITSAP	21		766	170	351	54	2,114	68	531	198	1,686	2,209	573	1,285	6,267	2,086	745	18,184	40,284	338	32,873	70,440	872,651	1,053,873	7.0%
Attraction Totals			146,925	19,737	61,980	7,423	339,604	9,341	77,717	10,411	179,776	365,761	139,564	147,684	932,893	132,344	37,113	2,516,603	3,288,814	27,010	3,208,960	2,534,014	964,202	15,147,876	100.0%
Attraction Shares			1.0%	0.1%	0.4%	0.0%	2.2%	0.1%	0.5%	0.1%	1.2%	2.4%	0.9%	1.0%	6.2%	0.9%	0.2%	16.6%	21.7%	0.2%	21.2%	16.7%	6.4%	100.0%	
Redmond Production			*399,718*	*2.6%*																					
Redmond Attraction			*662,727*	*4.4%*																					

Prepared by: RST

Redmond TFP Update

Table 18
2020 Daily Total Persons - Transit%
2020 Redmond/BKR - Baseline

PRODUCTION		ATTRACTION	1 REDCBD	2 REDNE	3 REDWIL	4 REDGL	5 REDOLK	6 REDVPT	7 REDSE	8 BEARCK	9 WOODKV	10 KIRKLBO	11 KIRKEAST	12 BELOLK	13 BELLEVUE	14 SAMM	15 REDRGE	16 SNOCO	17 SEATTLE	18 EKINGCO	19 SKINGCO	20 PIERCE	21 KITSAP	Prod Totals
REDCBD	1		1.6%	0.5%	1.7%	0.8%	5.6%	0.3%	0.6%	0.5%	0.3%	1.4%	1.1%	0.7%	2.0%	0.2%	0.2%	0.5%	7.9%	0.0%	1.2%	0.8%	0.0%	2.2%
REDNE	2		1.6%	0.1%	1.1%	0.5%	4.0%	0.0%	0.4%	0.6%	0.2%	0.6%	0.5%	0.3%	1.2%	0.4%	0.0%	0.3%	10.9%	0.0%	1.0%	0.0%	0.0%	1.7%
REDWIL	3		1.2%	0.2%	0.6%	0.2%	2.1%	0.0%	0.4%	0.0%	0.2%	0.7%	0.6%	0.4%	1.2%	0.0%	0.3%	0.4%	7.5%	0.0%	1.3%	0.7%	0.0%	1.2%
REDGL	4		2.7%	1.1%	3.0%	0.4%	5.0%	1.8%	2.8%	0.0%	0.3%	1.9%	1.0%	1.5%	2.8%	0.8%	0.8%	0.0%	11.9%	0.0%	1.4%	0.0%	0.0%	3.3%
REDOLK	5		1.9%	0.7%	1.5%	0.8%	2.9%	0.3%	0.6%	0.6%	0.4%	1.3%	1.2%	0.6%	1.2%	0.3%	0.3%	0.5%	5.1%	0.0%	1.1%	0.8%	0.0%	1.8%
REDVPT	6		3.9%	1.6%	5.9%	2.2%	6.8%	1.1%	4.3%	0.0%	0.9%	4.2%	2.5%	1.5%	3.7%	0.9%	1.3%	0.0%	10.3%	0.0%	1.3%	0.0%	0.0%	4.6%
REDSE	7		1.8%	0.3%	2.6%	1.1%	5.2%	0.0%	0.6%	0.0%	0.2%	1.2%	0.9%	0.5%	1.5%	0.1%	0.1%	0.3%	5.1%	0.0%	1.0%	0.5%	0.0%	1.9%
BEARCK	8		0.5%	0.0%	0.3%	0.0%	1.0%	0.0%	0.1%	0.1%	0.0%	0.3%	0.3%	0.1%	0.4%	0.0%	0.0%	0.1%	2.5%	0.0%	0.5%	0.3%	0.0%	0.4%
WOODV	9		0.5%	0.0%	0.3%	0.1%	1.3%	0.0%	0.1%	0.2%	0.1%	0.3%	0.4%	0.2%	0.8%	0.3%	0.1%	0.2%	4.9%	0.0%	0.7%	0.3%	0.0%	0.6%
KIRKLBO	10		1.0%	0.2%	0.6%	0.3%	1.9%	0.0%	0.2%	0.9%	0.2%	0.4%	0.5%	0.3%	0.9%	0.3%	0.1%	0.2%	6.0%	0.0%	0.9%	0.6%	0.0%	1.3%
KIRKEAST	11		1.1%	0.3%	0.6%	0.2%	1.9%	0.0%	0.3%	0.0%	0.3%	0.6%	0.5%	0.4%	1.0%	0.4%	0.3%	0.4%	6.6%	0.0%	1.0%	0.6%	0.0%	1.1%
BELOLK	12		2.9%	1.2%	4.1%	1.7%	3.7%	1.6%	1.9%	0.0%	0.5%	2.6%	1.9%	0.8%	2.0%	0.5%	0.4%	0.4%	6.0%	0.0%	0.9%	0.6%	0.0%	2.5%
BELLEVUE	13		2.1%	1.1%	2.5%	1.6%	3.8%	1.5%	1.2%	0.5%	0.4%	2.8%	1.6%	1.2%	1.9%	0.3%	0.3%	0.5%	5.1%	0.0%	0.6%	0.5%	0.0%	2.2%
SAMM	14		0.8%	0.1%	0.7%	0.0%	1.4%	0.0%	0.2%	0.5%	0.2%	0.6%	0.5%	0.3%	0.7%	0.1%	0.0%	0.5%	5.1%	0.0%	0.3%	0.7%	0.0%	0.7%
REDRGE	15		0.8%	0.1%	0.6%	0.0%	1.1%	0.0%	0.2%	0.0%	0.2%	0.5%	0.4%	0.2%	0.5%	0.0%	0.0%	0.3%	3.2%	0.0%	0.5%	0.4%	0.0%	0.6%
SNOCO	16		1.8%	0.4%	2.1%	0.8%	3.2%	0.2%	0.3%	0.6%	0.2%	0.8%	1.2%	1.0%	3.4%	0.2%	0.1%	0.6%	8.4%	0.0%	3.4%	3.8%	0.1%	1.7%
SEATTLE	17		3.1%	1.2%	2.3%	1.7%	3.2%	1.1%	0.7%	1.2%	0.5%	1.4%	1.9%	1.1%	2.4%	0.4%	0.2%	0.4%	8.5%	0.0%	1.2%	1.2%	0.2%	7.5%
EKINGCO	18		1.4%	0.0%	0.8%	0.0%	2.0%	0.0%	0.2%	0.4%	0.1%	0.7%	0.6%	0.3%	0.9%	0.1%	0.0%	0.2%	4.4%	0.0%	0.3%	1.0%	0.0%	0.7%
SKINGCO	19		3.0%	1.1%	2.6%	1.6%	3.2%	0.6%	0.8%	1.1%	0.7%	2.7%	2.4%	1.0%	2.1%	0.2%	0.1%	1.6%	10.3%	0.1%	0.3%	0.5%	0.0%	1.5%
PIERCE	20		31.2%	19.2%	23.4%	24.5%	32.9%	21.2%	19.4%	5.6%	10.1%	29.0%	30.7%	23.3%	27.2%	9.4%	6.8%	12.6%	33.2%	1.5%	10.5%	9.2%	2.8%	10.4%
KITSAP	21		43.3%	25.7%	32.5%	32.7%	43.6%	29.7%	26.7%	5.3%	13.3%	36.1%	40.1%	30.5%	33.5%	9.1%	6.7%	11.8%	31.6%	0.0%	11.7%	8.1%	4.6%	7.4%
Attraction Totals			2.6%	1.1%	2.0%	1.7%	4.4%	1.3%	1.2%	0.6%	0.6%	1.8%	1.7%	2.0%	3.0%	0.7%	0.5%	0.8%	9.7%	0.1%	1.6%	8.8%	4.3%	4.9%

Table 19
2020 Daily Total Persons - Carpool%
2020 Redmond/BKR - Baseline

PRODUCTION		ATTRACTION → REDCBD 1	REDNE 2	REDWIL 3	REDGL 4	REDOLK 5	REDVPT 6	REDSE 7	BEARCK 8	WOODKV 9	KIRKLBO 10	KIRKEAST 11	BELOLK 12	BELLEVUE 13	SAMM 14	REDRGE 15	SNOCO 16	SEATTLE 17	EKINGCO 18	SKINGCO 19	PIERCE 20	KITSAP 21	Prod Totals
REDCBD	1	0.5%	0.5%	2.4%	0.4%	2.2%	3.8%	1.7%	0.0%	0.1%	0.4%	0.3%	0.7%	1.2%	0.8%	0.4%	0.1%	0.5%	0.0%	0.4%	0.0%	0.0%	1.1%
REDNE	2	2.6%	0.6%	8.8%	1.1%	5.7%	5.1%	6.1%	0.9%	0.5%	1.3%	1.0%	1.5%	2.3%	4.5%	1.9%	1.2%	2.2%	5.1%	1.8%	0.0%	0.0%	3.3%
REDWIL	3	2.4%	1.3%	4.5%	0.9%	6.7%	7.0%	6.7%	0.9%	0.3%	1.0%	0.7%	1.7%	2.6%	2.8%	1.5%	0.5%	2.2%	0.0%	1.0%	0.0%	0.0%	2.9%
REDGL	4	2.4%	1.4%	6.6%	0.3%	4.6%	4.4%	6.4%	0.0%	0.3%	1.2%	0.6%	1.2%	2.0%	4.1%	1.6%	0.8%	2.2%	0.0%	1.7%	0.0%	0.0%	2.9%
REDOLK	5	0.5%	0.4%	1.5%	0.2%	0.9%	1.7%	1.0%	0.0%	0.1%	0.3%	0.2%	0.3%	0.6%	0.4%	0.2%	0.0%	0.3%	0.0%	0.2%	0.0%	0.0%	0.6%
REDVPT	6	1.7%	0.8%	5.9%	0.0%	3.8%	1.4%	4.3%	0.0%	0.0%	1.0%	0.6%	0.7%	1.7%	2.8%	1.3%	0.8%	2.3%	0.0%	2.0%	0.0%	0.0%	2.4%
REDSE	7	0.5%	0.4%	3.1%	0.5%	2.0%	3.3%	1.2%	0.0%	0.1%	0.4%	0.3%	0.5%	0.9%	0.9%	0.3%	0.1%	0.6%	1.2%	0.5%	0.0%	0.0%	1.0%
BEARCK	8	5.6%	2.3%	13.3%	2.5%	9.7%	6.5%	9.7%	0.7%	1.7%	2.3%	1.9%	2.4%	3.6%	7.5%	3.0%	3.5%	4.4%	5.3%	2.3%	0.0%	0.0%	4.3%
WOODV	9	3.3%	1.2%	7.3%	0.8%	6.4%	4.6%	7.2%	0.8%	0.7%	1.0%	1.0%	1.4%	1.8%	3.4%	2.3%	2.0%	2.8%	2.7%	0.9%	0.0%	0.0%	2.1%
KIRKLBO	10	2.7%	1.7%	6.3%	0.8%	5.1%	4.9%	6.0%	1.4%	0.8%	1.0%	0.8%	1.1%	1.8%	2.2%	1.7%	3.4%	3.3%	1.7%	0.9%	0.0%	0.0%	2.1%
KIRKEAST	11	2.2%	1.3%	4.7%	0.6%	5.0%	4.8%	4.9%	0.6%	0.4%	0.7%	0.5%	1.1%	1.5%	1.7%	1.3%	0.7%	1.3%	1.8%	0.6%	0.0%	0.0%	1.6%
BELOLK	12	1.8%	1.2%	5.4%	0.6%	3.4%	2.6%	3.0%	0.0%	0.3%	1.0%	0.5%	0.6%	1.5%	1.9%	0.8%	0.2%	1.9%	0.0%	1.1%	0.0%	0.0%	2.0%
BELLEVUE	13	1.6%	1.1%	4.3%	0.7%	3.9%	4.4%	2.8%	0.5%	0.1%	0.9%	0.4%	0.9%	1.1%	2.8%	0.8%	0.1%	3.9%	2.1%	2.1%	0.0%	0.0%	1.7%
SAMM	14	5.6%	4.2%	14.4%	2.2%	9.5%	7.8%	10.6%	1.9%	0.8%	2.3%	1.9%	2.3%	3.2%	2.1%	2.3%	0.6%	7.4%	4.2%	2.9%	0.0%	0.0%	4.0%
REDRGE	15	3.3%	1.9%	9.9%	1.0%	6.2%	5.8%	5.7%	1.2%	0.7%	1.6%	1.2%	1.4%	2.5%	3.1%	0.9%	0.8%	2.5%	1.4%	2.6%	0.0%	0.0%	3.2%
SNOCO	16	3.1%	2.4%	7.7%	0.9%	4.7%	4.9%	8.0%	3.4%	1.7%	1.5%	1.3%	1.1%	1.6%	3.1%	2.8%	3.7%	4.8%	4.9%	0.6%	0.0%	0.1%	3.6%
SEATTLE	17	0.2%	0.2%	1.0%	0.0%	0.7%	1.1%	0.6%	0.4%	0.2%	0.3%	0.2%	0.2%	0.4%	1.0%	0.2%	1.3%	2.5%	0.2%	2.8%	0.1%	0.3%	2.3%
EKINGCO	18	6.6%	3.8%	13.9%	2.4%	8.6%	6.3%	11.3%	3.0%	2.4%	2.0%	2.0%	1.9%	3.3%	6.8%	1.9%	3.7%	4.9%	1.7%	3.7%	0.0%	0.0%	3.7%
SKINGCO	19	1.8%	1.3%	4.3%	0.6%	4.8%	4.3%	5.3%	0.4%	0.1%	0.8%	0.5%	1.3%	1.8%	3.6%	1.6%	0.1%	7.4%	3.5%	2.8%	1.2%	0.1%	3.2%
PIERCE	20	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	3.5%	0.0%	8.5%	3.5%	0.9%	3.9%
KITSAP	21	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.7%	9.1%	0.0%	4.2%	1.8%	2.7%	3.1%
Attraction Totals		2.3%	1.3%	6.1%	0.7%	3.9%	4.3%	5.2%	1.5%	1.0%	1.0%	0.8%	0.9%	1.3%	2.5%	1.4%	3.5%	3.4%	2.1%	3.4%	3.3%	2.5%	**3.1%**

Table 20
2020 Daily Total Persons - Non-carpool%
2020 Redmond/BKR - Baseline

PRODUCTION		ATTRACTION → REDCBD 1	REDNE 2	REDWIL 3	REDGL 4	REDOLK 5	REDVPT 6	REDSE 7	BEARCK 8	WOODKV 9	KIRKLBO 10	KIRKEAST 11	BELOLK 12	BELLEVUE 13	SAMM 14	REDRGE 15	SNOCO 16	SEATTLE 17	EKINGCO 18	SKINGCO 19	PIERCE 20	KITSAP 21	Prod Totals
REDCBD	1	97.5%	87.4%	95.9%	80.7%	92.2%	90.2%	97.6%	98.1%	99.4%	97.5%	95.8%	96.6%	95.9%	96.2%	98.2%	98.8%	91.3%	98.9%	97.9%	95.4%	94.7%	95.7%
REDNE	2	94.3%	49.5%	90.1%	77.2%	90.3%	91.7%	93.2%	79.0%	98.2%	96.3%	94.5%	94.8%	94.6%	82.2%	92.5%	92.9%	85.1%	84.6%	93.0%	46.5%	41.5%	89.2%
REDWIL	3	95.8%	71.7%	95.0%	69.7%	91.2%	88.2%	92.8%	94.5%	98.8%	95.8%	88.8%	94.9%	94.6%	92.2%	95.7%	97.0%	89.3%	97.0%	96.0%	86.5%	81.6%	93.1%
REDGL	4	93.1%	70.3%	90.4%	42.8%	90.3%	85.4%	90.6%	85.7%	97.8%	91.1%	74.7%	89.3%	91.5%	79.7%	90.6%	89.3%	83.3%	80.0%	91.2%	44.4%	30.8%	87.9%
REDOLK	5	97.1%	93.1%	97.0%	81.8%	96.5%	81.6%	98.3%	98.1%	99.4%	97.9%	96.8%	96.3%	96.9%	97.8%	98.8%	98.8%	94.2%	99.0%	98.2%	95.5%	94.4%	96.6%
REDVPT	6	92.6%	79.7%	88.2%	69.2%	89.4%	60.7%	91.3%	87.5%	98.2%	92.6%	89.0%	76.7%	90.3%	84.4%	91.1%	88.3%	84.8%	75.0%	91.0%	43.2%	33.3%	86.7%
REDSE	7	96.2%	83.0%	94.3%	81.5%	92.8%	93.0%	97.8%	95.9%	99.4%	97.6%	96.1%	96.4%	95.6%	86.2%	93.6%	97.9%	92.8%	95.1%	97.0%	86.3%	81.8%	95.0%
BEARCK	8	92.7%	78.5%	86.4%	87.5%	89.3%	92.0%	90.0%	56.5%	97.7%	96.2%	95.9%	95.2%	94.2%	84.6%	92.9%	90.8%	90.3%	82.8%	88.2%	34.0%	28.7%	87.4%
WOODV	9	95.2%	65.7%	92.4%	77.8%	92.3%	91.3%	92.5%	69.7%	95.4%	93.9%	92.9%	93.9%	95.1%	85.0%	91.7%	90.5%	89.3%	88.2%	91.8%	43.6%	38.8%	92.3%
KIRKLBO	10	95.8%	82.9%	93.0%	79.5%	93.0%	91.7%	93.7%	90.3%	97.1%	92.2%	93.4%	94.8%	95.4%	91.7%	95.2%	90.0%	87.4%	91.9%	94.4%	56.8%	50.7%	92.2%
KIRKEAST	11	96.2%	86.5%	94.7%	66.6%	93.1%	91.7%	94.8%	96.1%	97.9%	96.2%	89.1%	95.5%	96.3%	94.2%	96.5%	97.0%	91.0%	96.4%	96.7%	85.4%	80.2%	94.2%
BELOLK	12	94.6%	88.8%	90.5%	69.5%	92.9%	81.9%	95.1%	97.2%	98.8%	94.2%	88.1%	87.6%	92.4%	93.6%	96.8%	96.7%	90.7%	96.1%	96.1%	85.3%	78.4%	91.8%
BELLEVUE	13	95.9%	93.0%	93.2%	89.2%	92.3%	90.4%	96.0%	96.8%	99.3%	94.5%	95.5%	94.0%	93.0%	90.4%	97.7%	96.5%	89.9%	95.0%	93.6%	83.6%	73.0%	92.8%
SAMM	14	92.6%	90.9%	85.0%	92.6%	89.1%	91.5%	89.1%	94.3%	98.8%	96.6%	96.2%	96.4%	95.0%	90.5%	95.4%	89.6%	86.4%	87.2%	93.2%	66.8%	59.3%	91.1%
REDRGE	15	95.1%	81.1%	89.5%	86.2%	92.7%	92.1%	93.7%	89.1%	98.7%	96.8%	94.9%	95.8%	95.4%	81.9%	81.0%	90.6%	92.5%	73.6%	92.0%	56.5%	53.1%	89.8%
SNOCO	16	94.1%	91.4%	90.1%	92.7%	92.1%	93.1%	91.7%	92.9%	97.9%	96.8%	96.2%	96.5%	93.6%	91.6%	95.2%	89.0%	84.0%	87.6%	88.4%	63.1%	61.6%	88.8%
SEATTLE	17	96.3%	92.3%	96.7%	92.2%	96.2%	93.1%	98.6%	95.6%	99.1%	97.4%	95.9%	96.3%	95.0%	95.9%	97.9%	92.9%	84.9%	95.6%	93.8%	80.8%	74.8%	86.1%
EKINGCO	18	91.9%	91.2%	85.3%	94.1%	89.4%	92.9%	88.4%	90.4%	97.3%	96.8%	96.3%	96.7%	95.2%	91.2%	97.1%	82.5%	89.1%	85.8%	85.5%	44.8%	58.2%	87.8%
SKINGCO	19	94.3%	91.5%	93.1%	92.0%	92.0%	92.9%	93.9%	93.8%	99.0%	95.7%	95.5%	96.2%	94.0%	93.8%	96.6%	84.1%	80.0%	91.3%	90.9%	86.8%	66.2%	89.7%
PIERCE	20	68.6%	65.4%	76.6%	63.8%	67.0%	71.8%	80.5%	81.8%	89.4%	69.3%	65.8%	73.7%	70.7%	81.5%	87.5%	70.6%	56.9%	77.4%	77.6%	81.7%	74.9%	79.9%
KITSAP	21	56.4%	54.7%	67.5%	51.9%	56.4%	61.3%	73.1%	80.5%	86.0%	61.5%	54.7%	64.9%	63.0%	78.1%	86.2%	65.5%	53.0%	60.7%	71.5%	71.8%	86.5%	81.9%
Attraction Totals		94.3%	74.6%	91.9%	77.1%	91.7%	87.5%	93.5%	78.1%	96.9%	93.9%	92.5%	92.6%	92.8%	90.4%	91.2%	88.8%	83.1%	85.4%	89.4%	81.3%	84.9%	**86.7%**

RST International Inc.

Redmond 2020 Mode Shares With CTR Adjustments:

Table 18a
HBW 2020 Daily Total Persons - Transit%
2020 Redmond/BKR - Baseline

PRODUCTION	ATTRACTION	REDCBD	REDNE	REDWIL	REDGGL	REDOLK	REDVPT	REDSE	REARCK	WOOKV	KIRKLBO	KIRKEAST	BELOLK	BELLEVUE	SAMM	REDRGE	SNOCO	SEATTLE	EKINGCO	SKINGCO	PIERCE	KITSAP	Prod Shares
REDCBD	1	22.0%	1.4%	10.9%	3.7%	33.3%	0.0%	2.5%	0.0%	7.7%	8.2%	6.4%	2.4%	8.4%	2.1%	0.0%	10.0%	66.1%	0.0%	12.0%	0.0%	0.0%	18.4%
REDNE	2	7.2%	0.3%	2.2%	1.0%	11.3%	4.0%	0.9%	4.0%	2.9%	1.9%	1.4%	0.7%	2.6%	1.4%	0.0%	1.3%	38.0%	0.0%	4.8%	0.0%	0.0%	5.8%
REDWIL	3	4.2%	0.0%	2.4%	1.0%	6.4%	1.5%	0.0%	0.0%	1.5%	1.0%	0.8%	0.4%	1.7%	0.0%	0.0%	0.0%	22.3%	0.0%	2.3%	0.0%	0.0%	4.0%
REDGL	4	13.6%	7.2%	9.0%	9.4%	16.5%	2.6%	8.0%	0.0%	5.3%	8.5%	8.8%	7.5%	8.4%	3.7%	4.0%	0.0%	40.3%	0.0%	7.7%	0.0%	0.0%	12.6%
REDOLK	5	22.4%	0.0%	12.9%	5.6%	26.4%	0.0%	3.5%	0.0%	10.0%	4.8%	6.3%	1.3%	4.8%	3.7%	0.0%	0.0%	54.5%	0.0%	7.0%	0.0%	0.0%	16.0%
REDVPT	6	24.5%	14.3%	18.7%	22.2%	23.4%	4.4%	16.3%	0.0%	14.9%	20.4%	22.2%	11.0%	12.3%	4.8%	8.3%	0.0%	35.6%	0.0%	7.9%	0.0%	0.0%	18.7%
REDSE	7	19.2%	1.6%	12.5%	6.3%	26.5%	0.0%	3.8%	0.0%	5.9%	7.3%	6.0%	2.1%	6.1%	1.1%	0.0%	0.0%	37.9%	0.0%	6.5%	0.0%	0.0%	13.9%
REARCK	8	1.2%	0.0%	0.4%	0.0%	2.9%	0.0%	0.1%	0.0%	0.1%	0.4%	0.4%	0.0%	0.6%	0.0%	0.0%	0.0%	5.9%	0.0%	1.4%	0.0%	0.0%	0.8%
WOOKV	9	1.9%	0.0%	1.0%	0.0%	3.3%	0.0%	0.2%	0.0%	0.1%	0.5%	0.4%	0.0%	0.9%	0.0%	0.0%	0.0%	14.6%	0.0%	2.0%	0.0%	0.0%	1.6%
KIRKLBO	10	3.4%	0.0%	1.4%	0.7%	6.2%	0.0%	0.2%	2.1%	0.7%	0.4%	0.7%	0.4%	1.9%	1.3%	0.0%	0.3%	16.2%	0.0%	4.0%	0.0%	0.0%	4.6%
KIRKEAST	11	3.9%	0.0%	1.4%	0.0%	5.9%	0.0%	0.2%	0.0%	1.1%	0.6%	0.6%	0.2%	1.8%	2.1%	0.0%	1.5%	35.1%	0.0%	4.2%	0.0%	0.0%	3.7%
BELOLK	12	19.4%	9.8%	15.7%	18.2%	16.6%	4.2%	11.2%	0.0%	8.7%	14.5%	16.2%	7.4%	8.4%	3.5%	2.9%	9.1%	27.3%	0.0%	5.8%	0.0%	0.0%	12.8%
BELLEVUE	13	15.6%	9.3%	12.1%	13.7%	16.8%	3.4%	8.5%	0.0%	7.9%	19.6%	17.1%	8.8%	11.8%	6.0%	1.8%	9.1%	16.9%	0.0%	2.9%	0.0%	0.0%	12.7%
SAMM	14	2.0%	0.0%	1.0%	0.0%	3.0%	0.0%	0.2%	0.0%	1.1%	0.6%	0.3%	0.2%	0.9%	0.3%	0.0%	1.4%	8.6%	0.0%	0.5%	0.0%	0.0%	1.5%
REDRGE	15	5.2%	0.0%	5.6%	3.4%	12.7%	0.0%	0.6%	0.7%	0.4%	1.7%	3.5%	1.1%	6.0%	0.0%	0.0%	0.0%	16.0%	0.0%	6.7%	0.0%	0.0%	4.5%
SNOCO	16	29.6%	12.5%	23.1%	20.0%	36.7%	3.1%	9.6%	0.0%	2.7%	6.5%	12.1%	7.4%	9.4%	2.1%	0.0%	1.3%	26.8%	0.0%	3.4%	6.3%	12.8%	25.7%
SEATTLE	17	3.2%	0.0%	1.2%	0.0%	4.9%	0.0%	0.3%	0.4%	0.2%	1.1%	1.0%	0.3%	1.2%	0.1%	0.0%	0.2%	7.0%	0.0%	0.3%	0.0%	0.0%	1.5%
EKINGCO	18	10.3%	2.4%	8.9%	5.3%	10.7%	0.5%	2.2%	0.0%	3.0%	6.3%	5.3%	1.8%	3.4%	0.3%	0.0%	6.8%	16.1%	0.0%	10.0%	1.8%	17.0%	4.4%
SKINGCO	19	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PIERCE	20	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
KITSAP	21	6.6%	0.8%	3.5%	3.8%	12.5%	0.7%	1.3%	0.8%	0.5%	2.5%	2.3%	0.4%	1.5%	0.4%	0.0%	0.0%	23.5%	0.0%	1.5%	2.9%	0.2%	8.6%
Attraction Shares		6.6%	0.8%	3.5%	3.8%	12.5%	0.7%	1.3%	0.8%	0.5%	2.5%	2.3%	0.4%	1.5%	0.4%	0.0%	0.0%	23.5%	0.0%	1.5%	2.9%	0.2%	

Prepared by: RST

Table 19a
HBW 2020 Daily Total Persons - Carpool%
2020 Redmond/BKR - Baseline

PRODUCTION	ATTRACTION	REDCBD 1	REDNE 2	REDWIL 3	REDGL 4	REDOLK 5	REDVPT 6	REDSE 7	BEARCK 8	WOODKV 9	KIRKLBO 10	KIRKEAST 11	BELOLK 12	BELLEVUE 13	SAMM 14	REDRGE 15	SNOCO 16	SEATTLE 17	EKINGCO 18	SKINGCO 19	PIERCE 20	KITSAP 21	Prod Shares
REDCBD	1	15.4%	13.0%	22.7%	7.4%	14.7%	7.7%	21.9%	0.0%	7.7%	7.7%	7.1%	7.8%	8.7%	18.8%	10.4%	20.0%	7.1%	0.0%	20.0%	0.0%	0.0%	13.8%
REDNE	2	15.8%	10.3%	21.4%	6.6%	17.4%	6.7%	19.4%	12.0%	6.8%	7.1%	6.8%	7.1%	8.1%	17.4%	9.4%	19.2%	10.8%	22.2%	21.0%	0.0%	0.0%	14.5%
REDWIL	3	25.2%	17.7%	31.4%	11.8%	27.4%	11.0%	29.9%	33.3%	10.7%	11.0%	10.7%	11.6%	13.0%	27.3%	15.6%	33.3%	18.0%	0.0%	30.8%	0.0%	0.0%	21.2%
REDGL	4	14.7%	9.8%	20.7%	6.3%	15.8%	6.6%	18.4%	0.0%	5.3%	6.1%	6.0%	6.3%	6.9%	18.5%	8.0%	25.0%	9.9%	0.0%	19.2%	0.0%	0.0%	12.3%
REDOLK	5	15.2%	13.6%	23.7%	5.6%	15.6%	7.5%	22.2%	0.0%	10.0%	7.9%	7.8%	7.6%	8.4%	18.5%	11.8%	25.0%	8.8%	0.0%	20.9%	0.0%	0.0%	12.4%
REDVPT	6	11.8%	7.1%	18.7%	0.0%	13.5%	5.9%	16.3%	0.0%	0.0%	5.3%	5.6%	5.5%	6.0%	14.3%	8.3%	33.3%	10.3%	0.0%	15.8%	0.0%	0.0%	10.3%
REDSE	7	9.0%	8.1%	16.7%	6.3%	11.2%	5.1%	14.2%	0.0%	5.6%	5.1%	4.5%	5.2%	5.6%	12.9%	6.7%	14.3%	7.1%	25.0%	16.1%	0.0%	0.0%	9.8%
BEARCK	8	20.2%	12.2%	24.7%	9.5%	23.0%	8.1%	22.8%	10.8%	8.0%	8.8%	8.4%	8.8%	10.3%	20.4%	10.4%	15.1%	18.4%	19.7%	25.4%	0.0%	0.0%	16.1%
WOODV	9	15.5%	8.9%	19.5%	6.1%	18.1%	6.3%	18.2%	9.4%	5.7%	6.6%	6.4%	6.9%	8.1%	16.6%	8.6%	16.0%	12.9%	16.7%	20.7%	0.0%	0.0%	11.6%
KIRKLBO	10	18.6%	11.9%	22.6%	7.3%	20.4%	7.7%	22.5%	12.5%	6.8%	6.6%	6.8%	7.9%	8.6%	21.0%	11.3%	24.2%	11.6%	20.0%	21.9%	0.0%	0.0%	11.9%
KIRKEAST	11	17.3%	12.0%	22.2%	7.4%	18.8%	7.3%	21.0%	14.3%	7.1%	6.8%	6.6%	7.2%	8.1%	18.8%	10.4%	24.4%	11.3%	33.3%	21.1%	0.0%	0.0%	12.2%
BELOLK	12	15.6%	12.2%	22.7%	6.8%	17.4%	7.5%	20.6%	0.0%	8.7%	6.8%	6.6%	6.9%	7.6%	18.6%	11.8%	27.3%	13.1%	0.0%	19.7%	0.0%	0.0%	12.1%
BELLEVUE	13	19.3%	14.8%	26.6%	7.8%	19.3%	10.4%	24.8%	33.3%	10.5%	8.0%	8.4%	8.6%	9.1%	22.5%	15.8%	30.3%	17.9%	27.8%	20.6%	0.0%	0.0%	12.8%
SAMM	14	22.5%	16.7%	29.5%	9.8%	24.8%	9.3%	25.8%	12.1%	10.5%	10.1%	9.9%	9.6%	9.9%	15.8%	11.0%	24.3%	19.4%	18.2%	18.1%	0.0%	0.0%	17.4%
REDRGE	15	19.3%	13.2%	25.7%	6.9%	21.6%	7.5%	21.7%	12.1%	8.9%	8.6%	8.1%	8.4%	9.8%	17.2%	9.5%	20.0%	18.7%	15.0%	20.1%	0.0%	0.0%	16.8%
SNOCO	16	19.3%	13.4%	25.1%	8.5%	22.5%	9.5%	25.2%	13.9%	8.0%	8.1%	8.6%	9.9%	9.9%	25.3%	12.1%	20.9%	13.9%	20.8%	25.8%	0.0%	27.6%	18.5%
SEATTLE	17	12.7%	12.5%	23.1%	0.0%	14.7%	9.4%	25.0%	33.3%	9.8%	8.0%	8.4%	8.2%	7.6%	20.5%	18.2%	28.4%	13.1%	20.0%	22.8%	37.5%	29.8%	13.5%
EKINGCO	18	20.2%	12.1%	24.5%	10.0%	21.9%	8.2%	22.0%	11.1%	7.4%	8.4%	8.1%	8.6%	10.0%	17.2%	8.2%	16.4%	21.2%	13.1%	18.2%	0.0%	0.0%	15.6%
SKINGCO	19	21.3%	19.5%	32.1%	10.5%	25.5%	11.4%	28.6%	14.3%	12.1%	11.9%	12.4%	10.8%	11.2%	19.5%	13.7%	29.5%	17.4%	20.4%	17.2%	22.6%	23.5%	17.2%
PIERCE	20	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.8%	41.4%	0.0%	0.0%	14.3%	0.0%	27.3%	18.5%	29.0%	19.8%
KITSAP	21	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	49.9%	15.8%	0.0%	28.3%	32.0%	16.1%	17.1%
Attraction Shares		18.1%	12.1%	23.2%	7.6%	19.7%	8.1%	22.5%	12.4%	7.3%	7.5%	7.4%	8.3%	9.2%	17.8%	10.3%	21.1%	14.2%	15.7%	19.4%	18.6%	16.3%	**16.9%**

Table 20a
HBW 2020 Daily Total Persons - Non-carpool%
2020 Redmond/BKR - Baseline

PRODUCTION	ATTRACTION	REDCBD 1	REDNE 2	REDWIL 3	REDGL 4	REDOLK 5	REDVPT 6	REDSE 7	BEARCK 8	WOODKV 9	KIRKLBO 10	KIRKEAST 11	BELOLK 12	BELLEVUE 13	SAMM 14	REDRGE 15	SNOCO 16	SEATTLE 17	EKINGCO 18	SKINGCO 19	PIERCE 20	KITSAP 21	Prod Shares
REDCBD	1	62.7%	85.5%	66.4%	88.9%	52.0%	92.3%	75.6%	100.0%	84.6%	84.1%	86.4%	89.8%	83.0%	79.2%	89.6%	70.0%	26.8%	100.0%	68.0%	0.0%	0.0%	67.7%
REDNE	2	75.0%	89.3%	76.0%	91.8%	71.3%	93.3%	79.8%	84.0%	90.3%	91.1%	91.8%	92.1%	88.6%	81.3%	90.6%	79.5%	49.0%	77.8%	74.2%	0.0%	0.0%	79.1%
REDWIL	3	69.7%	82.3%	67.2%	88.2%	66.2%	89.0%	69.6%	66.7%	87.5%	88.0%	88.7%	88.0%	84.9%	72.7%	84.4%	66.7%	48.8%	100.0%	65.4%	0.0%	0.0%	74.7%
REDGL	4	68.8%	78.0%	70.3%	84.4%	67.7%	90.7%	73.6%	100.0%	89.5%	85.1%	85.2%	86.3%	82.8%	77.8%	88.0%	75.0%	47.6%	100.0%	73.1%	0.0%	0.0%	74.4%
REDOLK	5	59.5%	86.4%	63.4%	88.9%	56.0%	92.5%	74.2%	100.0%	80.0%	87.3%	85.9%	91.1%	86.3%	77.8%	88.2%	75.0%	35.0%	100.0%	72.1%	0.0%	0.0%	71.3%
REDVPT	6	58.1%	71.4%	62.6%	77.8%	63.1%	89.6%	67.4%	100.0%	85.7%	74.3%	72.2%	83.6%	78.8%	81.0%	83.3%	66.7%	50.0%	0.0%	76.3%	0.0%	0.0%	69.7%
REDSE	7	61.5%	88.7%	70.8%	87.5%	62.5%	94.9%	81.9%	100.0%	88.9%	86.9%	89.6%	92.7%	85.0%	86.0%	93.3%	85.7%	45.7%	75.0%	77.4%	0.0%	0.0%	74.1%
BEARCK	8	75.5%	87.8%	74.9%	90.5%	75.0%	91.9%	77.0%	89.2%	91.9%	90.8%	91.3%	91.2%	87.7%	79.6%	89.6%	84.7%	70.9%	80.3%	73.2%	0.0%	0.0%	82.4%
WOODV	9	81.1%	91.1%	80.0%	93.9%	78.6%	93.7%	81.7%	90.1%	94.0%	92.9%	93.1%	92.8%	89.5%	82.5%	91.4%	83.8%	70.5%	83.3%	76.7%	0.0%	0.0%	86.3%
KIRKLBO	10	76.3%	88.1%	76.0%	92.0%	73.3%	92.3%	77.3%	85.4%	92.4%	92.9%	92.5%	91.7%	89.1%	77.7%	88.7%	75.5%	71.9%	80.0%	74.1%	0.0%	0.0%	83.3%
KIRKEAST	11	77.5%	88.0%	76.5%	92.6%	75.6%	92.7%	78.7%	85.7%	91.8%	92.6%	92.9%	92.4%	89.7%	79.2%	89.6%	74.1%	52.9%	66.7%	74.6%	0.0%	0.0%	84.0%
BELOLK	12	61.1%	73.2%	61.6%	75.0%	66.0%	88.4%	68.2%	100.0%	82.6%	78.6%	77.2%	85.7%	82.0%	77.9%	85.3%	63.6%	56.5%	100.0%	74.6%	0.0%	0.0%	74.1%
BELLEVUE	13	62.3%	74.1%	61.3%	78.4%	63.9%	86.2%	66.7%	66.7%	81.6%	72.4%	74.5%	82.6%	78.4%	76.0%	82.5%	60.6%	64.4%	72.2%	77.1%	0.0%	0.0%	74.0%
SAMM	14	72.3%	82.9%	69.5%	90.2%	72.1%	90.7%	74.0%	84.8%	88.4%	89.1%	89.8%	90.2%	88.7%	84.0%	89.0%	74.3%	70.3%	81.8%	81.2%	0.0%	0.0%	80.3%
REDRGE	15	76.2%	86.8%	73.2%	93.1%	75.4%	92.5%	78.0%	87.9%	89.9%	90.9%	91.3%	91.3%	89.1%	82.6%	90.5%	80.0%	66.8%	85.0%	79.2%	0.0%	0.0%	81.3%
SNOCO	16	69.0%	85.6%	69.3%	88.1%	64.8%	90.5%	74.1%	85.4%	91.5%	90.2%	87.9%	88.2%	79.4%	74.1%	87.9%	79.2%	68.2%	79.2%	67.4%	0.0%	50.0%	76.5%
SEATTLE	17	46.5%	75.0%	53.8%	80.0%	48.6%	87.5%	65.4%	66.7%	87.5%	85.3%	79.4%	84.7%	81.4%	77.4%	81.8%	70.3%	60.0%	80.0%	73.8%	56.3%	57.4%	60.7%
EKINGCO	18	76.6%	87.9%	74.4%	90.0%	73.6%	91.8%	77.7%	88.4%	92.4%	90.5%	91.0%	91.1%	88.8%	82.7%	91.8%	83.5%	71.2%	86.9%	81.5%	0.0%	0.0%	83.0%
SKINGCO	19	58.9%	75.6%	59.1%	84.2%	63.9%	88.1%	69.2%	85.7%	84.8%	81.4%	82.2%	87.4%	82.6%	80.2%	86.3%	63.6%	63.5%	79.6%	82.2%	75.6%	58.8%	77.6%
PIERCE	20	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	66.7%	55.2%	0.0%	0.0%	30.0%	0.0%	68.0%	78.7%	66.5%	74.8%
KITSAP	21	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	44.1%	49.1%	0.0%	68.2%	58.6%	83.9%	75.8%
Attraction Shares		72.2%	86.7%	73.2%	88.8%	67.9%	91.1%	76.2%	87.0%	92.2%	90.0%	90.3%	87.9%	82.6%	81.8%	89.6%	78.0%	60.7%	84.3%	79.1%	78.5%	83.5%	**73.9%**

RST International Inc.

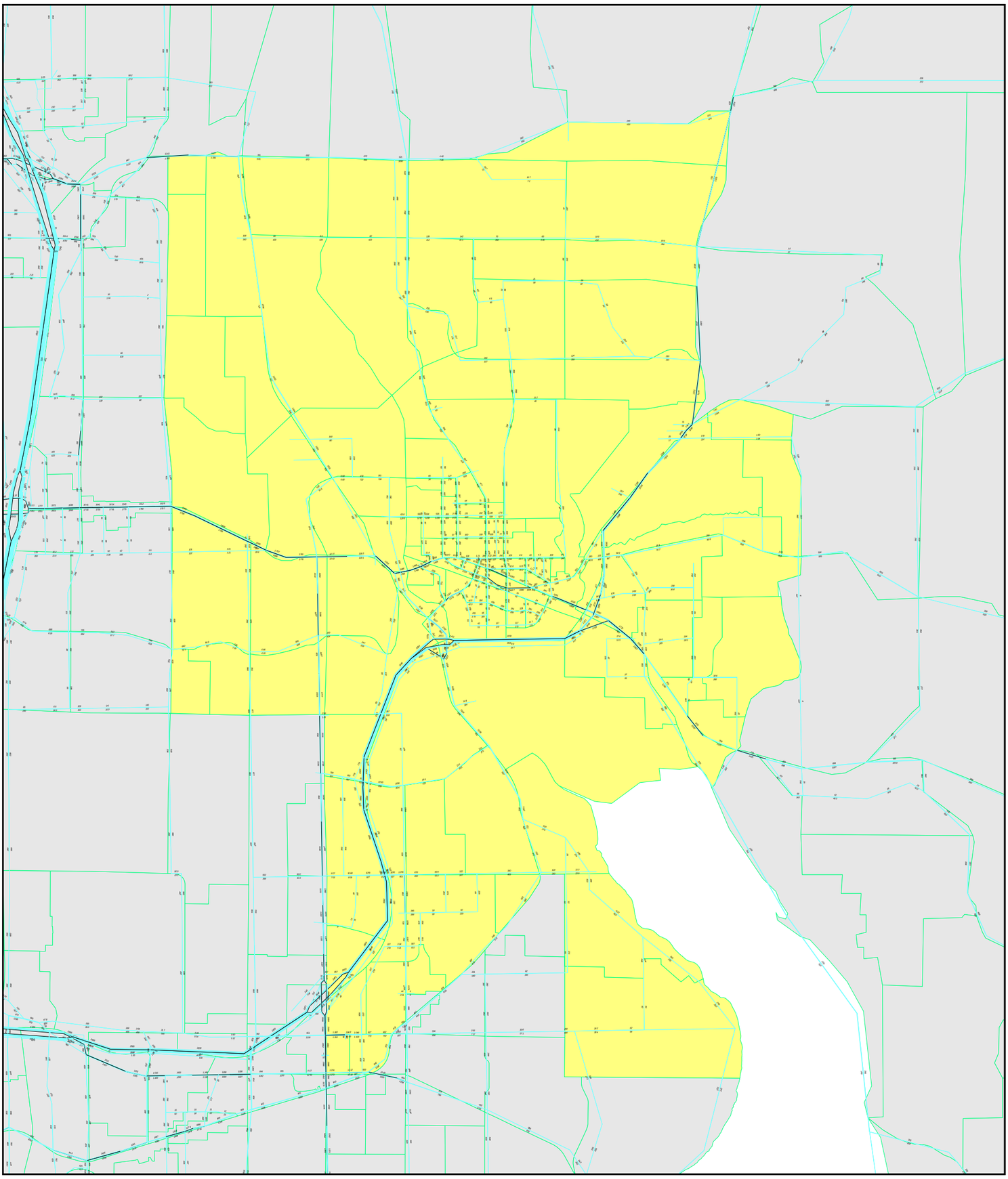
Redmond / PSRC 2020 PA Compare:

REDMOND 2020

DISTRICT	HBWP	HBWA	HBOP	HBOA	SCHP	SCHA	NHBP	NHBA
1	5,750	19,232	11,325	78,425	914	870	55,571	55,571
2	15,036	2,889	40,877	11,506	4,830	7,956	6,076	6,076
3	3,894	17,983	8,386	23,304	775	0	21,301	21,301
4	7,801	1,765	21,515	6,685	2,572	1,493	3,435	3,435
5	8,402	72,825	20,132	177,746	2,112	1,141	116,083	116,083
6	4,832	498	13,528	3,047	1,637	972	1,301	1,301
7	4,661	20,951	11,105	33,502	1,158	187	31,432	31,432
Redmond Total	50,376	136,144	126,868	334,216	13,999	12,619	235,199	235,199
8	10,494	1,997	21,184	6,311	3,987	3,481	5,448	5,448
9	49,716	26,277	139,670	97,452	17,916	5,733	64,522	64,522
10	68,343	48,145	184,040	169,804	21,573	15,964	113,671	113,671
11	23,375	21,155	63,387	97,380	7,474	10,571	70,496	70,496
12	22,605	16,728	57,545	81,206	6,415	9,451	54,416	54,416
13	91,155	142,549	246,214	494,872	28,934	35,299	338,806	338,806
14	43,855	19,656	86,449	60,844	7,806	9,489	51,141	51,141
15	22,931	6,799	54,154	23,126	5,051	4,320	17,089	16,946
16	656,092	456,298	1,424,025	1,090,965	190,823	192,296	978,244	978,245
17	559,917	960,324	1,182,640	1,532,699	130,820	134,201	1,307,232	1,307,232
18	19,277	5,127	41,634	14,511	6,182	3,971	12,786	12,786
19	676,773	632,787	1,418,643	1,384,633	201,740	203,286	1,268,380	1,268,384
20	690,672	562,495	1,542,151	1,273,768	203,536	205,507	1,068,632	1,068,632
21	225,871	174,971	548,875	475,691	97,097	97,168	390,684	390,684
Non-Redmond Total	3,161,076	3,075,309	7,010,610	6,803,262	929,355	930,735	5,741,547	5,741,409
Model Total	**3,211,452**	**3,211,452**	**7,137,478**	**7,137,478**	**943,353**	**943,355**	**5,976,747**	**5,976,609**

PSRC 2020

1	281	4002	1177	15482	169	0	12567	12567
2	19575	3664	35923	9552	4870	5396	7511	7511
3	9201	32331	17300	76289	2373	3200	69692	69692
4	7321	1465	13634	3122	1876	1067	2947	2947
5	11077	47661	20813	135636	2854	916	98207	98207
6	11819	1577	21801	4594	2921	1319	4151	4151
7	4606	14062	11428	28799	1773	0	30371	30371
Redmond Total	63880	104762	122076	273474	16836	11898	225446	225446
8	10494	1977	21110	6311	3134	2654	5448	5448
9	45912	30820	86667	72992	11331	12009	65430	65430
10	86266	61618	172380	169949	23011	24476	139964	139964
11	10219	23378	20557	57875	2800	8271	42727	42727
12	29004	21965	59688	66125	9249	5230	51088	51088
13	88326	190181	203037	450636	34802	36504	350644	350644
14	43855	19463	86146	60844	7806	9401	51141	51141
15	14088	1928	27924	5520	4187	4218	5089	5089
16	656092	451812	1419039	1090965	190823	190518	978244	978245
17	559917	950883	1178500	1532699	130820	132960	1307232	1307232
18	19277	5077	41488	14511	6182	3934	12786	12786
19	676773	626566	1413676	1384633	201740	201406	1268380	1268384
20	690672	556965	1536752	1273768	203536	203606	1068632	1068632
21	225871	173251	546953	475691	97097	96269	390684	390684
Non-Redmond Total	3156766	3115884	6813917	6662519	926518	931456	5737489	5737494
Model Total	**3220646**	**3220646**	**6935993**	**6935993**	**943354**	**943354**	**5962935**	**5962940**



Miles: 4 Inches

0 0.40 0.79

UFOSNET Pro 5.1.0

City of Redmond Travel Demand Model

1999 PM Peak Total Vehicle Volumes

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RST International Inc., Bellevue, WA, USA. (RST)

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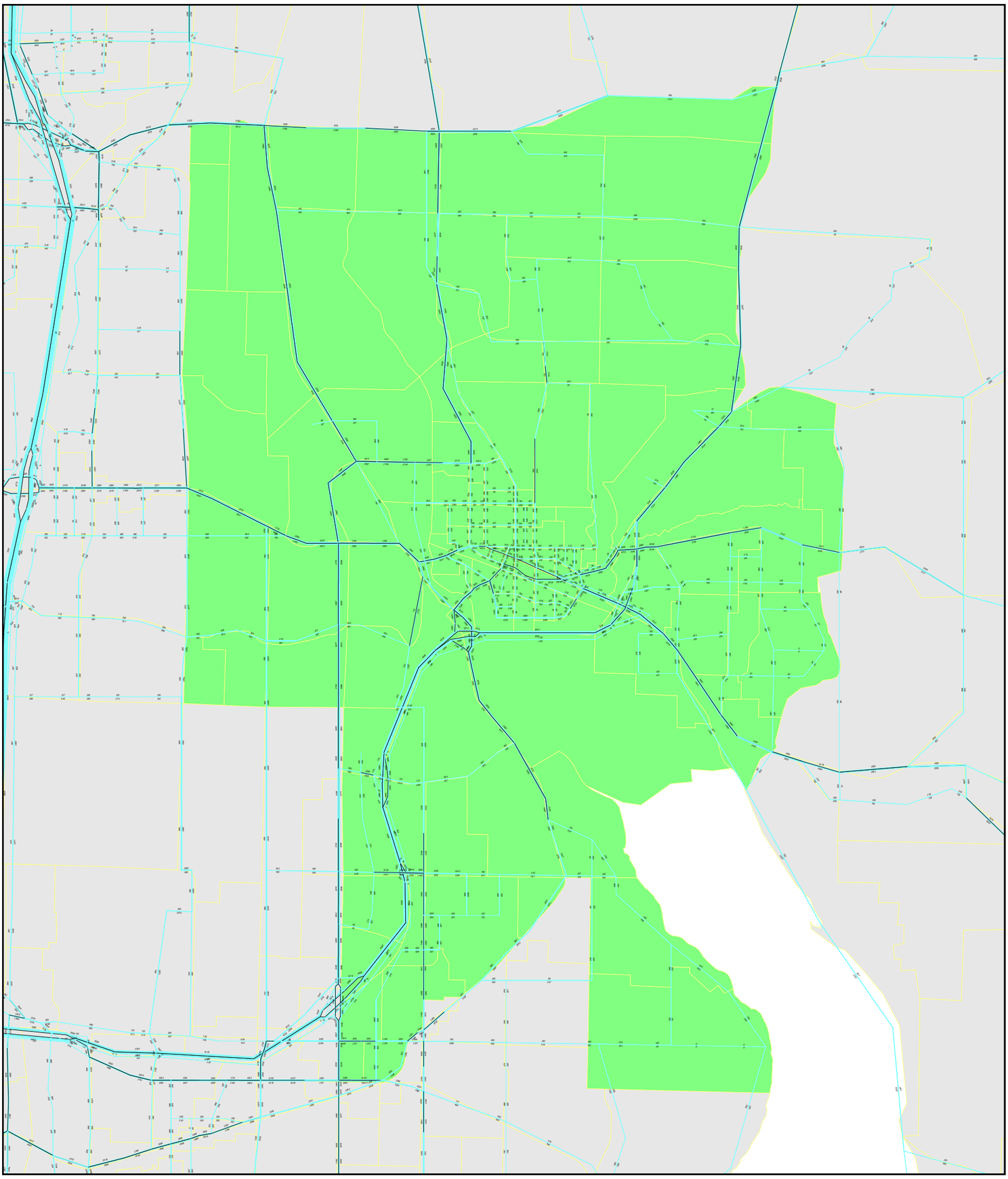

Miles: 4 Inches

0 2.00 4.00

UFOSNET Pro 5.1.0

Redmond 2020 TFP PM Network

Total PM Peak Hour Vehicle Volumes

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